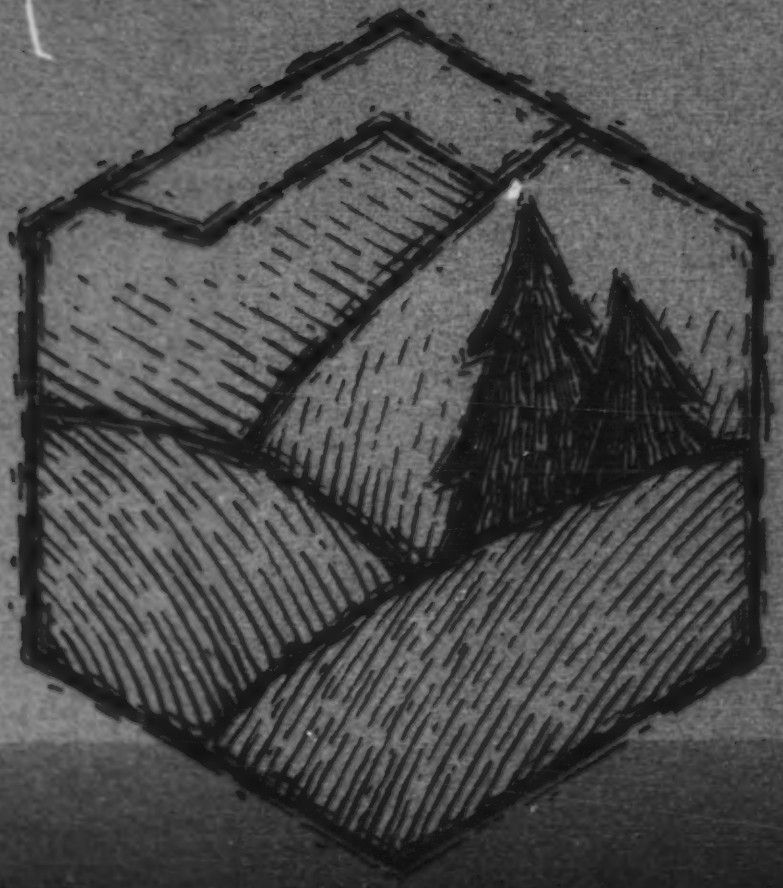
SUNDANCE

PROVINCIAL PARK

Management Plan



Alberta

2008-06052/

SUNDANCE PROVINCIAL PARK MANAGEMENT PLAN

September, 2006

Preface

The Sundance Provincial Park Management Plan provides a long-term vision and day-to-day guidance for stewardship of the park. Department staff, within the context of existing legislation and regulations, prepared the plan. It outlines the type and extent of outdoor recreation and tourism opportunities, facilities and services. The plan provides direction regarding the delivery of heritage appreciation programs that assist Albertans and visitors to understand and appreciate our natural heritage while ensuring its ongoing preservation.

The management plan was developed with public input and is intended to provide for the periodic review and revision to reflect the current thinking of Albertans on how our natural heritage will be preserved for present and future generations.

The Minister responsible for parks and protected areas has authorized the implementation of the management plan and retains authority to amend or interpret its provisions.

VISION STATEMENT FOR THE PARK

"Sundance Provincial Park will be managed through clear direction to maintain the health, biodiversity and uniqueness of this ecosystem. Rare and significant natural features will be preserved while providing opportunities for compatible backcountry recreational and educational opportunities."

TABLE OF CONTENTS

1.0 INTRODUCTION 1

1.1 ENVIRONMENTALLY SIGNIFICANT AREAS OF SUNDANCE PROVINCIAL PARK 1
1.2 ESTABLISHMENT OF THE PROVINCIAL PARK 3
1.3 HISTORY OF PROVINCIAL PARK AREA AND STEWARDSHIP 4
1.4 PURPOSE OF THE MANAGEMENT PLAN 4
1.5 PUBLIC INVOLVEMENT 4

2.0 ROLE IN ALBERTA'S NETWORK OF PROTECTED AREAS 6

2.1 OBJECTIVES 6
2.2 NATURAL REGIONS FRAMEWORK 6
2.3 CLASSIFICATION AND LEGISLATION 10
2.4 CONTRIBUTIONS OF THE PROVINCIAL PARK TO PROVINCIAL OBJECTIVES 10
2.5 GUIDING PRINCIPLES 11

3.0 OVERVIEW OF PROVINCIAL PARK 11

3.1 REGIONAL SETTING AND ACCESS 11
3.1.1 Special Management Zone 12
3.1.2 Regional Economy 12
3.1.3 Access Routes 12
3.2 DESCRIPTION OF PROVINCIAL PARK 14
3.2.1 Geomorphology and Landform 14
3.2.2 Groundwater, Drainage and Hydrology 15
3.2.3 Springs 16
3.2.4 Tufa and Marl 16
3.2.5 Marl Fen 17
3.2.6 Archaeological, Historical and Cultural Resources 17
3.2.7 Wildlife 18
3.2.8 Fisheries 19
3.2.9 Vegetation and Soils 20
3.2.10 Recreation 20

4.0 PROVINCIAL PARK ZONING 22

4.1 PRESERVATION ZONE 22
4.2 WILDLAND ZONE 22
4.3 FACILITY ZONE 24
4.4 INTEGRATED MANAGEMENT ZONE 24
4.5 ACCESS ZONE 24

5.0 MANAGEMENT OBJECTIVES AND ACTIONS REQUIRED 25

5.1 PRESERVATION 25
5.1.1 Systems Related 25
5.1.2 Geology/Soils/Landform 25
5.1.3 Vegetation 26
5.1.4 Wildlife 26
5.1.5 Water, Springs and Riparian Habitat Management 27
5.1.6 Aesthetic Resource Management 27
5.1.7 Pollution Management 27
5.1.8 Mineral Resource Management 28
5.1.9 Special Management Zone 28
5.1.10 Grazing 29

5.1.11 Research *29*
5.1.12 Administration, Maintenance and Operational Support *29*
5.1.13 Cultural Resources *30*
5.1.14 Volunteer Management *30*
5.2 HERITAGE APPRECIATION 30
5.2.1 Interpretation *30*
5.2.2 Historic *31*
5.3 OUTDOOR RECREATION 31
5.3.1 General Outdoor Recreation Management *31*
5.3.2 General Access Management *32*
5.3.3 Facility and Trails Management *32*
5.3.4 Hiking *33*
5.3.5 Camping *33*
5.3.6 Day Use *34*
5.3.7 Equestrian Use *35*
5.3.8 Motorized Access *36*
5.3.9 Fishing, Boating and Canoeing *36*
5.3.10 Trapping *37*
5.3.11 Public Safety *37*
5.4 HERITAGE TOURISM 37
5.4.1 General Tourism Management *37*
5.4.2 Commercial Tourism Activities *38*
5.5 REGIONAL COOPERATION 38

6.0 IMPLEMENTATION OF PLAN 38

6.1 PROJECTS IDENTIFIED IN PLAN 38

FIGURE 1: SUNDANCE PROVINCIAL PARK MAP. 2
FIGURE 2: NATURAL REGIONS MAP 9

TABLE 1: AREA REPRESENTED FOR LOWER AND UPPER FOOTHILLS NATURAL HISTORY THEMES 8
TABLE 2: NATURAL HISTORY THEMES 8
TABLE 3: PRIORITY PROJECTS AND ACTIONS 39

GLOSSARY OF TERMS 40
LITERATURE CITED 43
APPENDIX I 46
APPENDIX II 47

1.0 INTRODUCTION

Sundance Provincial Park (SPP) was designated on April 28, 1999 under Alberta's Special Places Program. The Park is located in the Foothills Natural Region of west central Alberta. This 3,712 ha (37.12 km^2; 9,172 acres) Park is approximately 21 kilometres west of Edson. (See Figure 1, Sundance Provincial Park Map).

The Sundance Provincial Park is comprised of two separate portions of land: 1) the Sundance Creek portion along the Sundance Creek Valley from the Emerson Creek Road to Highway 16; 2) the Emerson Lakes portion further along the Emerson Creek Road, east of the Athabasca River and including the Emerson Lakes and part of Emerson Creek.

1.1 ENVIRONMENTALLY SIGNIFICANT AREAS OF SUNDANCE PROVINCIAL PARK

Environmentally significant areas are specific landscape features of the landscape. Sundance Provincial Park contains many unusual landforms unique to this area. Many of the landforms were created by the actions of past glaciations and de-glaciations.

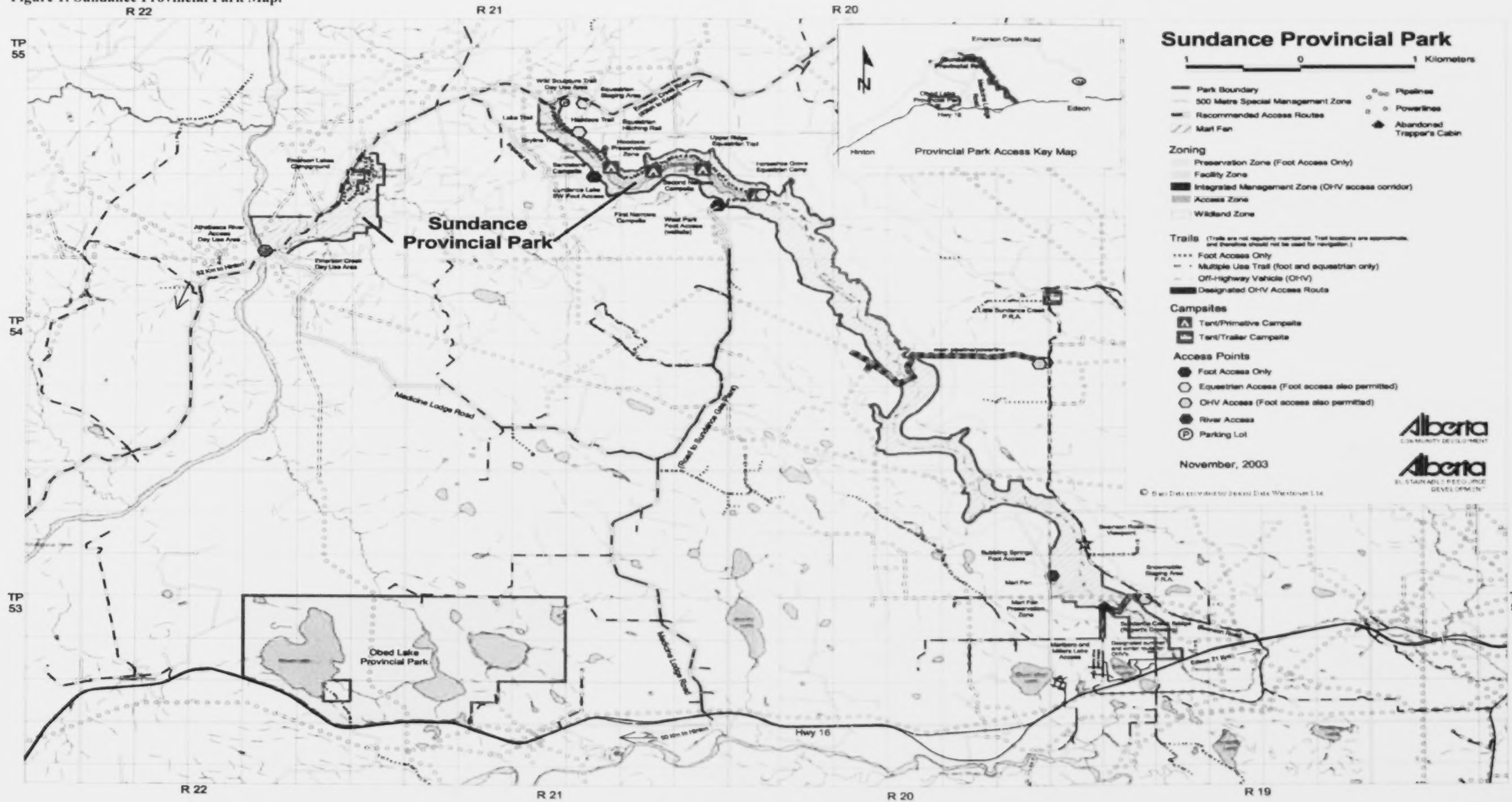
Sundance Hoodoos – High above Sundance and Beaver Lakes in the Sundance Valley lie some of the most unique sandstone hoodoos in Alberta. One can view these spectacular sculptures by hiking the **Wild Sculpture Trail System**. The trail winds along the east side of the valley, through mature aspen forests, profiling the eccentric sandstone sculptures formed by wind erosion and rainfall. The Wild Sculpture Trail System contains three distinct trails. The **Hoodoos Trail** runs below the sculptures to offer a close opportunity to appreciate the natural processes which created them. The **Lake Trail** is lower down in the valley with views of the hoodoos, lakes and riparian habitats in the valley. The **Skyline Trail**, along the ridgetop over the hoodoos, has a stunning skyline view of the Sundance Valley and a unique perspective of the hoodoos.

Sundance Valley – Sundance Creek winds more than 42 km north-south along the base of Sundance Valley, draining the Little Sundance and Sundance Lakes. This deeply incised channel was carved over thousands of years by meltwaters rushing off the receding glacier. Sundance Lake, valley and riparian area support a diversity of Upper and Lower Foothills habitats including moist spruce-fir woodlands, deciduous woodlands, marshy wetlands, beaver ponds, springs and aspen-alder-saskatoon shrubbery, which provide very productive breeding bird habitat. Sundance Lake and the surrounding riparian habitat is a major component of the Park and significant to its ecosystem health. As one walks the length of the Sundance Valley you enter a variety of habitats and associated microclimates, which demonstrate the diversity within the Park.

Marl Fen – This provincially significant site contains 12 different species of orchids, including the rare Bog Adder's Mouth (*Malaxis paludusa*) and five different species of carnivorous plants (some of which are also rare). Unique aquatic plants, sedges, rushes, mosses and ferns thrive in the area because of a unique combination of soils and fresh water springs hydrology.

Emerson Lakes – This area's glacial past is evident with features such as eskers, kettles and aeolian deposits. There is a diversity of vegetation, including sandy aspen, open water, marshy wetlands and beaver pond complexes. Small, deep lakes are nestled between high, steep esker ridges. These eskers, formed when the glacier retreated and the internal glacier streams left their streambeds, rich in stream-washed gravel, deposited on the landscape (Weldwood of Canada, 2002). This is one of the most diverse sandy habitat complexes in the Lower Foothills Area.

Figure 1: Sundance Provincial Park Map.



1.2 ESTABLISHMENT OF THE PROVINCIAL PARK

The establishment of Sundance Provincial Park originated out of Alberta's protected areas program "Special Places". The "Special Places" program ran from March 1995 until July 2001. The intent of "Special Places" was to establish a representative network of protected areas throughout the province to capture landscapes from the province's six natural regions. Sundance Provincial Park went through the "Special Places" process to be designated. The Park contributes to representation in the lower and upper subregions of the Foothills Natural Region.

Weldwood of Canada (Hinton Division) played a role in the development of Sundance Provincial Park, as we know it today. The Emerson Lakes Campground area was first constructed by Junior Forest Rangers and Weldwood of Canada (Hinton Division) in 1972. From 1972 to about 1996, the Alberta Forest Service and Weldwood of Canada (formerly called Northwest Pulp & Power and then St. Regis (Alberta) Ltd.) worked in partnership to manage Emerson Lakes as a Forest Recreation Area with primitive facilities. It was in 1996-1997, with the privatization of provincial campground operation, that Weldwood of Canada Ltd. began facility management for the Emerson Lakes area. Today Weldwood (now called Hinton Wood Products) maintains the facilities and trails within Sundance Provincial Park.

The Sundance Valley was included in three separate nominations to the Special Places Program. The Provincial Coordinating Committee (PCC) recognized the value of this site to fulfill the valley and wetland complex gaps in the Lower Foothills Natural Region. The PCC recommended that the site go to a local committee to develop recommendations to the Minister of (then) Alberta Environment. The Municipality of Yellowhead #94 (now Yellowhead County) accepted the opportunity to host and chair the local committee.

In February 1998, the Sundance Local Committee (LC) was formed and called its first meeting in Edson. Over the following nine months the committee reviewed detailed information on fisheries, forestry, wildlife, protected areas management, and unique vegetative features such as the Marl Fen. After many discussions the committee developed a series of recommendations in order to answer a number of questions regarding the future management of the Park. The recommendations covered boundaries, activities, management principles, and outstanding issues. As part of their recommendations, the Sundance LC included the establishment of a 500 metre Special Management Zone (SMZ) surrounding the Park along with a set of special conditions to guide the management of ongoing industrial activity within the SMZ. The LC held open houses in Edson and Hinton to present the recommendations to the general public and obtain feedback.

An Interdepartmental Committee (IC) consisting of representatives from the various government land use departments reviewed the LC's recommendations and made their recommendation to the Minister of (then) Alberta Environment. The IC recommended that the Minister approve Sundance as a Provincial Park as it is today.

On April 28 of 1999, Sundance Provincial Park was designated, adding 3,712 ha (37.12 km^2; 9,172 acres) to Alberta's network of parks and protected areas. In September of 2000, the management planning process was initiated for the Provincial Park[1].

[1] Order-in-Council 186/99.

1.3 HISTORY OF PROVINCIAL PARK AREA AND STEWARDSHIP

The Sundance Valley, which includes the Sundance Lakes and sandstone sculptures (Hoodoos) overlooking Beaver Lake, has been recognized as a special place for many years. When Northwest Pulp and Power Ltd. started to inventory its Forest Management Agreement Area in 1956, the uniqueness of the area was discovered. However, it was not until all-weather access was developed in 1969, with the construction of the Emerson Creek Road to the north of the valley, that protection and development of the valley became feasible. Accordingly, in 1977 Alberta Environment placed a "Protective Notation (PNT)[2]" on the north end of the valley from the Emerson Creek Road to Little Sundance Lake.

Construction of a hiking trail system, by the company crews, commenced in 1973. During the next 10 years the trail system was extended along the northeast side as far as the southern end of Sundance Lakes and three small "walk-in" campsites were developed. Since this time until designation, Weldwood of Canada Ltd. (Hinton Division), successor to Northwest Pulp and Power Ltd. (and now called Hinton Wood Products), had continued to manage the Sundance Valley, Lakes, Hoodoos, and Emerson Lakes area for low-intensity outdoor recreation only.

In addition to those who are formally recognized and responsible for management of these areas over the years, many local individuals and area users have also contributed. These informal stewards have worked hard to repair and maintain trails and bridges, and have played an enormous role in preserving this special area.

[2] A PNT can be used to impose an indefinite land use restriction for specific natural land features.

1.4 PURPOSE OF THE MANAGEMENT PLAN

This management plan will provide direction for the protection and use of Sundance Provincial Park for up to ten years from the date of approval. A preliminary review of this management plan will occur in five years. A major review of the management plan will occur not later than 10 years from its date of approval. Specifically, the management plan will:

- describe the Provincial Park;
- place the Provincial Park within the system of protected areas in Alberta and state its natural history themes;
- develop and define zoning for the Provincial Park;
- define objectives and management actions for the Provincial Park;
- outline surrounding land use and cooperation with surrounding land owners and managers; and
- outline implementation of the plan.

1.5 PUBLIC INVOLVEMENT

An important component of the park management planning process is the involvement of those interested in the ongoing management of the Provincial Park.

The planning process for the development of this management plan is unique in that it gathered stakeholder feedback using a considerably different approach than traditional planning processes. In this process the Planning Team held individual stakeholder meetings with identified key stakeholders on a one-on-one basis. The Forest Industry stakeholders were consultative members. The Planning Team also sought involvement and feedback from the Yellowhead Tribal Council, representing Aboriginal communities within the region.

In comparison, the traditional planning process obtained feedback and discussion

through joint advisory group meetings of representatives from each user/stakeholder group. In this traditional method, advisory group membership totaled approximately 25-30 members.

The advantage of the new technique, one-on-one meetings, is that stakeholders had full opportunity to voice their concerns and management recommendations.

The following stakeholders provided input into the management plan development: park users, trappers, recreational groups, adjacent land owners, local organizations & businesses, industry, municipalities, local county, Aboriginal communities, government agencies and the general public.

The public involvement process for this management plan was as follows:

Stage 1 – In September of 2000, Alberta Environment initiated the management planning process. Responsibility was transferred to Alberta Community Development in 2001, which developed the communications plan and public involvement process.

Stage 2 – In November of 2000, a list of the key stakeholders, public and Aboriginal communities was identified. Letters were sent to the list members introducing Sundance Provincial Park and the initiation of the management planning process. The letter identified three opportunities to provide feedback to the planning process. A public discussion forum was also held at the Marlboro Community Hall to provide Marlboro and Miller's Lake residents an opportunity to learn more about the Park and management planning process, and express their thoughts and ideas about future management.

Stage 3 – Between January 2001 and July 2002, individual meetings were held with stakeholders interested in expressing their concerns regarding future management of the Park. A standardized protocol and feedback form were used to ensure consistency between meetings, so that participants were provided the same information and questions. Meeting notes were recorded by the Planning Team and sent to participants to validate.

Stage 4 – The Sundance Planning Team developed the management plan as information, and feedback was received. The goal of the planning process was to develop a management plan that considered all stakeholder interests and feedback, while complying with the *Provincial Parks Act*.

Stage 5 – Stakeholder and broader public review of the draft management plan occurred between October and December 2002. Copies of the plan were available and two open houses were held (October 22 and November 25, 2002) to profile the management plan's recommended objectives and actions.

Stage 6 – The management plan was finalized, based on stakeholder and public review of the draft management plan and feedback.

Stage 7 – Plan implementation.

(See Appendix I for detailed outline of Sundance Provincial Park Management Planning Process.)

2.0 ROLE IN ALBERTA'S NETWORK OF PROTECTED AREAS

2.1 OBJECTIVES

Four broad objectives are the cornerstones of Alberta's network of protected areas. These broad objectives apply to the protected areas system as a whole.

Preservation

To preserve in perpetuity a network of parks and protected areas that represents the diversity of the province's natural heritage as well as related cultural heritage.

Heritage Appreciation

To provide opportunities to explore, understand and appreciate the natural, heritage of Alberta, and enhance public awareness and our relationship to and dependence on it.

Outdoor Recreation

To provide a variety of natural landscape dependent outdoor recreation opportunities and related facilities and services.

Heritage Tourism

To encourage residents and visitors to the province to discover and enjoy the natural heritage of Alberta through a variety of outdoor recreation and nature based tourism opportunities, facilities and accommodation services.

Specific Provincial Park management goals are outlined under Section 5.0 Management Objectives and Actions Required.

Each existing or potential protected area is assessed for its contribution to these objectives. Two tools aid this assessment: 1) the natural regions framework which identifies representative landscape themes of a protected area, and 2) the legislative classification of the site.

2.2 NATURAL REGIONS FRAMEWORK

The Alberta government is committed to protecting representative samples of Alberta's natural heritage. To help select which areas are the best samples, a framework based on natural features has been adopted. This framework is a hierarchy of natural regions, subregions and natural history themes. Natural regions provide the "big picture" of Alberta landscapes. Subregions and natural history themes are subdivisions of the natural regions and provide a more specific picture of smaller areas.

Natural Regions
↓
Natural Subregions
↓
Level 1 Themes
↓
Level 2 Themes
↓
Level 3 Themes

There are six natural regions in Alberta. Differences between these regions are apparent by their distinct landform features and vegetation. The six regions are Boreal Forest, Rocky Mountain, Foothills, Canadian Shield, Parkland and Grassland (See Figure 2. Natural Regions Map).

Each of these natural regions has been divided into subregions based on criteria that varies depending on the natural region. For example, the Foothills Natural Region is divided into two subregions, upper and lower, based on differences in elevation and the resulting differences in climate and vegetation. The Boreal Forest Natural Region, however, is divided into eight subregions based on vegetation, geology and landforms and varies with the predominant forest cover, topography (level, undulating, or hilly) and mix of uplands and wetlands. Subregions are further divided into Level 1, Level 2 and Level 3 Natural History themes.

Level 1 themes are based on easily observed landforms, such as wetlands and valley ridges.

Level 2 themes are more specific breakdowns of Level 1 themes. They refer to broad vegetation, habitat types or highly visible geological features. Examples of Level 2 themes in the Lower Foothills Subregion are: exposed bedrock (sandstone or shale), spring-seepage and fluvial outwash.

Level 3 themes are finer breakdowns of Level 2 themes. They include specific features such as: rare plants and animals, microhabitat, and specific geologic features such as sandstone hoodoos.

Because of their detail, themes are most useful for identifying the natural diversity within Alberta. Level 1 themes can usually be seen on aerial photographs, whereas Level 2 and Level 3 themes require detailed biophysical studies. Analysis of these themes can determine which sites in Alberta are the best examples of our natural heritage.

Sundance Provincial Park falls within the Foothills Natural Region of Alberta. Approximately 24.8% of Level 1 Natural History Themes are protected within Provincial Parks and Protected areas in the Lower Foothills Natural Region.

Much of the Park area, including Emerson Lakes and the Sundance Creek Valley is located within the Lower Foothills Subregion of the Foothills Natural Region. A small portion (approximately 6 km^2) of the northern portion of the Sundance Valley, as well as the plateau adjacent to the valley, is located within the Upper Foothills Subregion. Table 2 shows the approximate area in square kilometres of the Level 1 Themes represented according to subregion, within Sundance Provincial Park.

Table 1: Area represented for Lower and Upper Foothills Natural History Themes

SUNDANCE PROVINCIAL PARK		
Foothills Natural Region		
Level 1 Natural History Themes Area Represented (sq. km)		
Theme	Lower Foothills	Upper Foothills
Ridge/ Valley/ Wall	6.99	3.01
Floor Stream	15.0	3.00
Lake	1.8	0.2
Organic Wetland	2.9	0.2
Mineral Wetland	3.9	0.1

Sundance Provincial Park contributes to representation in all five Lower Foothills Level 1 natural history themes.

The area analysed for the Level 1 themes (37.10 km^2) was calculated using GIS and therefore differs slightly from the total size recorded in the Order in Council (37.12 km^2).

For the purposes of this management plan, and the Level 2 and 3 theme assessment, the Upper Foothills area (6.06 km^2) has been combined with the ridge/valley/wall Level 1 theme of the Lower Foothills.

Table 2 shows the Lower Foothills Level 1, Level 2 and Level 3/Special Natural History Themes represented in Sundance Provincial Park.

Table 2: Natural History Themes - Lower Foothills Subregion

SUNDANCE PROVINCIAL PARK	
Foothills Natural Region	
Lower Foothills Subregion	
Level 1 Natural History Themes	**Level 2 Natural History Themes**
Valley/Ridge Ridge/Valley Wall	❑ Morainal ❑ Lodgepole Pine Forest ❑ White Spruce Forest ❑ Black Spruce Forest ❑ Aspen-Spruce Forest ❑ Aspen Forest ❑ Grassland ❑ Exposed Bedrock Sandstone
Valley/Ridge Floor/Stream	❑ Outwash Fluvial Glaciofluvial ❑ Glaciolacustrine ❑ Spring-Seepage ❑ Lodgepole Pine Forest ❑ White Spruce Forest ❑ Black Spruce Forest ❑ Balsam Popular Forest ❑ Shrubland ❑ River
Wetland Mineral	❑ Marsh ❑ Black Spruce Forest ❑ Shrubland
Wetland Organic	❑ Patterned Fen ❑ Non-patterned Fen ❑ Black Spruce Forest ❑ Tamarack Forest ❑ Shrubland ❑ Graminoid Communities
Lake	❑ Mesotrophic
Special/ Level 3 Natural History Themes	❑ Hoodoos ❑ Sundance Valley ❑ Marl Fen ❑ Rare Plant Species and Communities

Figure 2. Natural Regions Map

2.3 CLASSIFICATION AND LEGISLATION

The classifications of parks and protected areas under Alberta legislation include the Wildland Provincial Parks, Provincial Parks and Provincial Recreation Areas under the *Provincial Parks Act;* the Wilderness Areas, Ecological Reserves, Natural Areas and Heritage Rangelands under the *Wilderness Areas, Ecological Reserves, Natural Areas and Heritage Rangelands Act*; and the Willmore Wilderness Park under the *Willmore Wilderness Park Act.*

These classifications vary in the contributions they make to provincial objectives. For example, Ecological Reserves contribute mostly to the preservation objective, but Provincial Recreation Areas contribute primarily to the outdoor recreation objective.

A Provincial Park protects natural and cultural landscapes and features. Provincial Parks offer a range of outdoor recreation opportunities and often associated support facilities to promote the appreciation of the park's natural heritage and cultural features. Interpretive and educational programs are offered in some Provincial Parks. These programs encourage visitors of diverse interests, ages, physical capabilities and skill to experience the park's natural environment without compromising its ecological integrity. Auto access is typically provided to staging areas and support facilities. Provincial Parks generally differ from Wildland Parks by allowing a greater range of outdoor recreation facilities and road access, as well as sometimes providing interpretive and educational programs.

Only sites of provincial or greater significance that are capable of providing high quality heritage appreciation, nature-oriented outdoor recreation or heritage tourism opportunities are suitable for consideration as Provincial Parks.

Provincial Parks are currently established under the *Provincial Parks Act*. This act mandates Provincial Parks to be developed and maintained for:

a) the conservation and management of flora and fauna;
b) the preservation of specified areas and objects therein that are of geological, cultural, ecological, or other scientific interest; and
c) to facilitate their use and enjoyment for outdoor recreation
(RSA 1980 cP-22 s3).

2.4 CONTRIBUTIONS OF THE PROVINCIAL PARK TO PROVINCIAL OBJECTIVES

Sundance Provincial Park contributes to all four provincial objectives.

Contributions to the Preservation Objective

- Protects 26 Level 2 Natural History Themes of the Lower Foothills Subregion. At least eight of these themes are present in significant numbers or cover a large area.
- Protects a wide diversity of vegetation, including at least 211 plant species
- Protects unique features such as patterned and non-patterned ground, marl fen, and springs.
- Protects special geologic features such as hoodoos, eskers, kames and the Sundance Valley.
- Protects wildlife habitat, providing a valley refuge for ungulates, black and grizzly bears, other mammals, birds and insects.

Contributions to the Heritage Appreciation Objective

- Offers visitors the opportunity to explore and appreciate the rich natural and cultural heritage found in the Provincial Park, specifically the marl fen and hoodoos areas.

- Offers significant potential for scientific research and educational opportunities.

Contributions to the Outdoor Recreation Objective

- Provides opportunities for hiking, horseback riding, and mountain biking on a designated trail system.
- Provides other opportunities for recreation such as designated backcountry and auto access camping, boating and fishing in the summer, and some snowshoeing, cross-country skiing and ice fishing in the winter.
- Provides two designated corridors for continued land and snow off-highway vehicle (OHV)[3] access across the Park.

Contributions to the Heritage Tourism Objective

- Provides opportunities for nature-based backcountry experiences.

2.5 GUIDING PRINCIPLES

The guiding principles for the management of Sundance Provincial Park were compiled from a number of sources (Hendee et. al, 1990; CEAC, 1991; Noss, 1995). They are based on wilderness and ecosystem-based management principles.

1. Ecosystem management attempts to care for the land in a responsible way that will sustain its ecosystem. In order to do this, all components of the ecosystem must be considered, including the natural landscape, ecological processes, physical and biological components, and human activities.

2. Ecosystem management means taking a long-term view instead of managing just for today. Sundance Provincial Park will be managed so its wildland character will be sustained for the future. However, this is a challenging responsibility because little is known about the complex dynamics of a natural system and how changes in one component affect other components. The key is to adapt management practices as one learns more about the natural and social conditions in a protected area.

3. The focus of this Provincial Park will be on allowing natural processes to operate as freely as possible, and on managing human use of the area to keep interference with natural processes to a minimum.

4. A protected area will not survive as an intact ecosystem without the support of the users, the stakeholders and the local community. Alberta Community Development will take the lead in seeking the involvement of these people and soliciting their support for Provincial Park objectives.

5. Provincial Parks do not exist in a vacuum. What goes on outside a Provincial Park can have an impact inside the Provincial Park. Conversely, designation of a protected area can affect the management of adjacent land. Provincial Park managers and adjacent land managers need to work together in order to reach the objectives of both areas.

[3] Restricted to vehicles with a curb weight of 590kg (1300lb) or less; tire pressure of 110Kpa (16psi) or less; wheel base of 1.85m (73") or less; and width of 1.78m (70") or less.

3.0 OVERVIEW OF PROVINCIAL PARK

3.1 REGIONAL SETTING AND ACCESS

Sundance Provincial Park lies approximately 21 km west of the Edson town centre within the Foothills Natural Region of Alberta. The Park extends approximately 42 km from the Emerson Creek Road (Hinton Wood Products Haul Road) in the northwest through to Hwy #16 (Yellowhead Highway) in the southeast. The Park is made up of two

separate areas: the Sundance Creek portion, and the Emerson Lakes portion.

3.1.1 Special Management Zone

Unique to Sundance Provincial Park, is a 500 metre Special Management Zone (SMZ), surrounding the Park. The SMZ provides a transition between the Park and surrounding area. The purpose of this zone is to protect the ecological integrity of Sundance Park by providing guidance for the management of ongoing industrial (i.e. forestry and energy) activity on land within the SMZ.

The Special Management Zone is under a Protective Notation (PNT) with special management guidelines (See Appendix II). The guidelines were developed in partnership with the forest and energy industry as part of the Special Places Local Committee process. Through partnership with industry, new recreational access around the Park periphery will be minimized. Adaptive management principles will be used to refine or change the guidelines over time to reflect new knowledge and techniques for site protection.

3.1.2 Regional Economy

The economy of the region is based primarily on the industries of forestry, oil & gas, coal mining, farming and small business.

The Park lies within two Forest Management Areas (FMAs): Hinton Wood Products in Hinton, and Weyerhaeuser Canada Ltd. in Edson. Wood from Hinton Wood Products' FMA is hauled to the Hinton mill to produce bleach kraft pulp and to supply the Hinton HI-ATHA sawmill. Hardwoods from the Weyerhaeuser FMA are used to manufacture oriented strand board (OSB) at the Edson mill, while softwoods are sent to their Drayton Valley mill to produce lumber.

The Coal Valley mine is located approximately 100 km south of Edson. It supplies bituminous thermal coal for electricity generation to export markets. Obed Mountain mine is located 30 km east of Hinton and contains bituminous coal for export for electricity generation.

3.1.3 Access Routes

Different parts of the Park can be accessed via a number of different routes. The routes and their approximate distances are described below.

Traveling from Edson – To reach the north end of Sundance Valley with the Wild Sculpture Trail Day Use Area and parking lot, travel north 33 km along Hwy # 748 from the Edson town centre, and then west 30 km along the Emerson Creek Road to the Wild Sculpture Trail Day Use area and parking lot turnoff.

The Emerson Lakes Campground turnoff is 8 km farther west along the Emerson Creek Road. Hwy #748 is paved two thirds of the way to the Emerson Creek Road. The remaining portion of this road and the Emerson Creek Road are gravel and is regularly maintained. Look for the Sundance Provincial Park sign at the junction of Emerson Creek Road and Hwy #748.

Swanson Road Access –The east side of Sundance Valley and the northern end of the Park can also be accessed via the Swanson Road. The Swanson Road heads northwest from Hwy #16, about 19 km west of the Edson town centre. Alternatively, if traveling east along Hwy #16, the Swanson Road is located approximately 67 km from Hinton on the north side of the highway. The Swanson Road is not signed, but is located across from the Bickerdike Road, which is signed heading south off Hwy #16.

Traveling 7.0 km northwest along the Swanson Road, you will discover a pullout, where the road runs right against the edge of

the valley, offering an excellent stop to catch beautiful views of the Sundance Valley.

The Little Sundance Provincial Recreation Area is located at kilometre 17 on the Swanson Road north of Hwy #16. The Little Sundance Provincial Recreation Area is managed by Alberta Community Development and operated by Hinton Wood Products. The PRA offers 8 non-serviced campsites with picnic tables and fire-pits. It serves as an excellent base for day trips into the Sundance Valley and adjacent areas.

Main pipeline/powerline – An access point is located off the Swanson Road approximately 3.2 km west along the main pipeline/powerline which runs through the north half of Sections 13, 14 and 15 Township 54, Range 20, West of the 5th Meridian. The Park can be accessed along this route via foot, horse, mountain bike and OHV (as defined in glossary).

Beyond the turnoff to the Little Sundance Provincial Recreation Area, the Swanson Road is not recommended for access to the Wild Sculpture Trail Day Use Area and parking lot, or Emerson Lakes Campground. The road is typically very muddy and wet most of the year, and generally requires a vehicle with 4 x 4 and good clearance.

Traveling from Hinton – Vehicle access from Hinton (junction of Hwy #16 and Switzer Drive) to the Emerson Lakes Campground turnoff is 56 km east along the Emerson Creek Road. Traveling 8 km further, you reach the Wild Sculpture Trail Day Use area and parking lot, and the start of the hiking trail system in the Park. If traveling via Hinton Wood Products' Haul Road, the distance from the Athabasca River Bridge (just north of Hinton) to the Emerson Lakes turnoff is approximately 49 km.

The Emerson Lakes Campground offers 10 non-serviced sites complete with tables and firepits, a boat launch and one fish-cleaning stand. Approximately 7 km of hiking trails circle three of the five Emerson Lakes, offering a variety of scenic viewpoints. Motorized access is not permitted within Emerson Lakes, or the greater Sundance Provincial Park area. In order to preserve the unique geologic sand formations of the Emerson Lakes area, only foot access is permitted along the trail system.

Emerson Lakes also provides anglers with fishing opportunities for rainbow trout and brook trout. Only electric motors are permitted on the lakes.

A pullout is found on the north side of the Emerson Creek Road (across from its junction with the Medicine Lodge Road) 11.8 km west of the Wild Sculpture Trail Day Use Area and parking lot.

A hand boat launch and random use area can be found 12.2 km west of the Wild Sculpture Trail Day Use area and parking lot. When traveling from Hinton the pullout area is clearly visible to the left after crossing the Athabasca River Bridge, 43.8 km from town. This popular spot is ideal for boat access onto the Athabasca River and experiences heavy use.

Other road accesses to the west side of Sundance Provincial Park and surrounding area include the Miller's Lake West Access Road heading north, Imperial Road and Medicine Lodge Road.

Millers Lake West Access – The Miller's Lake West access road, located 23 km west of Edson and 63 km east of Hinton along Hwy #16, can be used to access the Marl Fen area. To reach the Marl Fen, travel north along the Miller's Lake Access Road. The road will bend west. Turn right at approximately 1.6 km and continue north on a single lane gravel road. At approximately 2 km, the Marl Fen is found on the right side of the road.

Medicine Lodge Road – The Medicine Lodge Road is located 36 km west of Edson and 50 km east of Hinton along Hwy #16.

This road is used to access a wellsite, as well as the trailhead into Sundance Lake. It also connects with the Emerson Creek Road. To reach the trailhead, follow the right fork of the Medicine Lodge Road at kilometre 11.8. The right fork of this road does not have a name, however along the way, you will pass a sign which refers to the Sundance Gas Plant. Continue on and keep right when the road appears to fork again at kilometre 19. The right fork ends at the wellsite and trailhead at kilometre 22.9. The trailhead is the west access point for hiking into the Park. The left fork connects with the Emerson Creek Road at kilometre 28.8.

Imperial Road – The Imperial Road is used to access the Sundance Lake Southwest Foot Access. The Imperial Road turnoff is located 63.6 km east of Hinton and 2.9 km west of the Wild Sculpture Trail Parking Lot. The east-west cutline, which heads to the Sundance Lake SW Foot Access, is 4.3 km southeast along the Imperial Road from its junction with the Emerson Creek Road. To get there, go to kilometer 1.7 of the Imperial Road (from its junction with the Emerson Creek Road), and take the left fork (onto the single un-maintained gravel road) and continue 2.6 km to the east-west cutline. Travel 1.5 km east along the cutline to the Sundance Lake Southwest Foot Access and then 400 metres to the lake.

3.2 DESCRIPTION OF PROVINCIAL PARK

3.2.1 Geomorphology and Landform

Sundance Provincial Park lies within the Interior Plains physiographic region of Alberta. The Interior Plains region is underlain by bedrock belonging to the Paskapoo Formation of Paleocene age. The formation consists of weakly consolidated beds of sandstone and siltstone, with inter-bedded strata of shale, coal and chert conglomerate (Roed, 1968).

Elevation in the Sundance Provincial Park valley ranges from 950 metres to 1130 metres. Elevation in the Emerson Lakes area ranges from 917 metres to 1030 metres.

Surficial deposits in the Edson area have a complex origin and can be divided into a lower, middle and upper group (Gabert and Roed, 1968). Deposits in the lower group, comprising mainly gravel, underlie deposits of the middle group and overlie the bedrock of the area.

The middle group of deposits can be divided into till, glacial outwash, and glacial lake sediments. The deposits found on the uplands surrounding Sundance Creek Valley were primarily deposited from an ice-sheet originating in the Rocky Mountains (Cordilleran). The Cordilleran ice sheet came in contact with the Continental ice sheet originating from the Canadian Shield, just to the east of Sundance Valley. Tills of the Cordilleran contain many more pebbles and boulders than the till of Continental origin. Fairly extensive deposits of outwash sand and gravel are found in the area where Sundance Creek meets and crosses Hwy #16 in township 53, range 19, west of the 5th meridian (Gabert and Roed, 1968).

The Emerson Lakes area is characterized by drumlin and fluted moraine till deposits, as well as glaciofluvial outwash plains. There are also moderate inclusions of glaciolacustrine, and organic deposits in low-lying areas (Nelson *et al.* 1988). This area is a deeply eroded landscape of eskers, lakes and streams. This unique area is named after the largest lake in the area, Emerson Lake (Geographics Dynamic Corp., 2001).

In contrast, the Sundance Creek Valley is a deeply incised valley comprised of glaciofluvial deposits from meltwaters off the Cordilleran and possibly Continental Glaciers (Gabert and Roed, 1968). There are distinct differences in geomorphology and landform, both north-

south and east-west along this valley (Geographics Dynamic Corp., 2001).

Northern areas of the valley are characterized by long, steep slopes (70-80%) extending 100-500 m, or longer to the valley floor. These slopes are predominantly of glaciofluvial origin, with localized fluvial activity, minor slumpage and erosion occurring along the slope face. In the plateaus above the valley, level to rolling moraines are common, with isolated occurrences of organic materials in low-level depressions (Nelson *et al.*, 1988). The valley bottom represents a glaciofluvial outwash channel that has been modified by active fluvial and latchstring processes.

Southern portions of the valley are generally characterized by undulating expanses of morainal till or glaciofluvial uplands (Bentz *et al.* 1986) emerging onto short (30-100 m) steep (70-80%) slopes down to the valley bottom. The valley bottom is dominated by organic and fluvial materials deposited over the remnants of a glaciofluvial outwash channel (Bentz *et al.* 1986).

The east facing slopes of the northern portion of Sundance Valley are much longer (greater than 500 m) than the west facing ones. These slopes have a (30-60%) slope and exhibit patterns of glaciofluvial terracing (Geographics Dynamic Corp. 2001)

Unique sandstone cliffs and sculptures, called the Sundance Hoodoos, are found along the west facing slopes of the northern portion of the Sundance Valley. Wind and rain has eroded away the softer sand and siltstone layers leaving behind the more resistant bedrock, as a cap rock, creating the unique "hoodoo" formations. There is also exposed bedrock on the east facing slopes of the valley, which may erode over time to form more sandstone sculptures.

3.2.2 Groundwater, Drainage and Hydrology

Groundwater is an important factor of the hydrology in this area. "It is an active agent in the formation of Gleysolic and Organic soils, and it relates to forest productivity by providing water to lower slope positions in excess of that available from precipitation" (Dumanski et. al. 1972).

Groundwater flow within the Paskapoo Formation (which underlies the Sundance Park area) is believed to consist of a series of local and intermediate flow systems which are part of a regional recharge configuration to the northeast and east. Groundwater movement through the permeable sandstones of this formation is rapid and emerges on hillsides and slopes as contact springs, and in lower areas as soapholes, muskeg or hummocky terrain.

The permeability of the bedrock in the area is primarily due to fracturing. Groundwater that escapes these local areas of discharge form intermediate flow systems which discharge at regional topographic lows such as the Athabasca River or the Edson Lowlands. Ground waters which contribute to regional flow systems are believed to discharge in the area northeast and east of the Edson area (into the McLeod River) (Vogwill, 1983).

Drainage from the Emerson Lakes area feeds into the Athabasca River. Beaver Lake is drained by Kayolee Creek into the Athabasca River. Sundance Creek drains Little Sundance and Sundance Lakes into the McLeod River. Both the Athabasca and McLeod Rivers are part of the Arctic Ocean drainage.

3.2.3 Springs

The Edson area, including the Sundance Provincial Park area, is unique due to the large number of groundwater discharge areas in the form of springs. The majority (approximately 75 percent) of the springs in the area discharge calcium magnesium bicarbonate groundwater (Vogwill, 1983).

In general, springs of the Edson area can be classified into four groups according to the Earth Sciences Report 79-7 (Vogwill, 1983). In order of decreasing occurrence they are: boulder-tufa, boulder, soaphole-ungulate lick (also known as a mineral lick), and sulphur. The groundwater from the boulder-tufa springs is rich in calcium carbonate, which precipitates when it cascades from the discharge point. Boulder-tufa springs are the most common type of springs found within the Park. They are locally and more commonly known as marl springs where they flow from the marl fen area of the Park. Freshwater springs forming cascading waterfalls are also common along the east facing slopes of the northern portion of Sundance Valley (Geographics Dynamic Corp. 2001).

There are no sulphur springs present within Sundance Provincial Park. The closest occurrence is at Miette Hotsprings, located inside Jasper National Park. One significant mineral lick was identified, less than 100 metres south of the transmission line along the eastern slopes of the valley, during the vegetation survey conducted in the summer of 2001 (Geographics Dynamic Corp. 2001). Other mineral licks were spotted from the air during an aerial survey of the Park by planning staff in the fall of 2000. The large number of animal tracks leading up to soaphole-ungulate licks indicates that ungulates prefer to drink at these discharge sites for the high sodium content of the groundwater.

See Glossary of Terms for spring definitions.

3.2.4 Tufa and Marl

The formation of tufa and marl deposits requires a source of calcium carbonate within glacial bedrock. The process of deposition occurs through leaching of this carbonate by percolating acidic groundwater, transportation of calcium bicarbonate ions in an aquifer, discharge at the surface, and precipitation of calcium carbonate due to the removal of $C0_2$ from the water. "Presence of high topographic relief to promote groundwater flow through short, local groundwater systems favors marl deposition". Generally, marl deposits form at ponded discharge sites and tufa forms at well-drained sites (Macdonald, 1982).

In the past, there have been three uses for marl in Alberta: as a livestock feed supplement, to treat agricultural soils and reduce soil acidity called soil liming, and to produce cement. Extraction of marl for cement production began in the Edson region shortly after sizable local marl deposits were discovered north of Hwy #16 in 1911. Marlboro community was named for the nearby marl deposits (Yellowhead Regional Planning Commission, 1987). In 1913, the Marlboro Cement Plant, Alberta's first cement plant, was built by the Edmonton Portland Cement Company. The site was chosen for its proximity to the marl deposits and Grand Trunk Pacific Railway. The plant operated until 1931 when it was purchased by Canada Cement and subsequently shut down. The old plant's chimney still stands high above the muskeg and is seen by motorists on Hwy #16 (Mussieux and Nelson, 1998).

In the early 1980's a survey was conducted by the Alberta Geological Survey and the Alberta Research Council to evaluate possible sources of calcium carbonate for treating acidic agricultural soils in the Peace River –Grande Prairie and central regions of Alberta. The results were compiled in an Earth Science Report 82-1 (Macdonald, 1982).

The Edson area was not explored extensively for marl due to the great distance from agricultural areas, however eight reports of marl and tufa locations were collected in addition to the aforementioned deposit. One marl report lies within the Sundance SMZ at South Sundance Lake (Macdonald, 1982).

Located within the Park boundaries is a unique feature locally known as the "Bubbling Springs" (rge 19, twp 53, sec 19, NW5, W5M). The deep hole from which the spring water flows is actually a result of a Marl hole that was drilled there in the early 1980's. For many years, local people have come to the springs to gather drinking water. Approximately 700, 000 litres per day of water flow from this hole (This information is based on local knowledge).

3.2.5 Marl Fen

There is a special area within the Park known as the "Marl Fen". The area has been incorrectly referred to as a bog for several years. Unlike a bog (which is a nutrient-poor plant community of acidic wet areas that is not influenced by mineral ground water), the marl fen contains nutrient-rich organic wetlands characterized and influenced by mineral bearing groundwater and a slightly alkaline pH.

There are a significant number of springs or groundwater flows occurring throughout the Marl Fen area, providing ideal conditions for a variety of plants that require these nutrient-rich soils. The high ground water table of this area makes it extremely sensitive to disturbance. The area supports a number of carnivorous plants and species rare within the province.

See glossary of terms for specific definitions.

3.2.6 Archaeological, Historical and Cultural Resources

Archaeological Sites – There is presently only one known archaeological site within Sundance Provincial Park and the 500-metre SMZ area. According to the archaeological and historical records held within Alberta Community Development, the site (FjQe-5) is located at the southeast end of the Park. The site contains a shallowly buried campsite with lithics and fire broken rock. The age of the site is unknown due to the absence of any diagnostic artifacts.

Given that the Sundance Creek and Lakes are contained within the Park area, and that the area was explored by settlers as early as the 1900's, it is likely that there are many archaeological sites within the Park area. Therefore any major land disturbance associated with park development should be preceded by an impact assessment (Eric Damkjar, Alberta Community Development, pers. comm., 2001).

There is an abandoned trapper's cabin on the west side of Sundance Creek along an existing OHV trail. The walls of the old cabin are structurally sound and would make an excellent site for an interpretive sign.

First Settlers – The primary inhabitants of the Yellowhead Region during the 1800's were the Assiniboine (Stoney) and the Cree Indians. The Assiniboine Indians of the Yellowhead Region belonged to the Siouans linguistic group. Originating in the east near Lake Superior/Hudson Bay, they moved northwest joining the Cree in the late 18th century. The Assiniboine were a plains people and very involved with buffalo hunting and the fur trade.

The Cree belonged to the Algonquin linguistic family. There were two types of Cree Indians in the Yellowhead Region: the Plains and Woodland Cree. The Cree also originated in Ontario. Using the gunpowder they received from the white man, they pushed west in search of furs. When they

reached the prairies they formed an alliance with the Assiniboine for their mutual protection. Growth in their population and the drive for more furs drew them westward into the Yellowhead Region (Yellowhead Regional Planning Commission, 1986).

Coal Branch – The railway brought modernization to the Yellowhead Region and led to the development of the first two population centers: Edson and the "Coal Branch". Edson, originally established as Heatherwood, was incorporated as a town in 1911. The Coal Branch region, along the northern east slopes, comprised a number of settlements that developed as a result of demand for coal for the railways. The Coal Branch reached its coal production peak during the Second World War. About 16500 people lived in the various settlements that dotted the Coal Branch at that time.

After the Second World War, diesel oil replaced steam as the power source for trains causing a decline in the coal industry. All areas experienced economic stagnation except Edson, which by this time had stabilized as a railroad and agricultural centre (Dumanski et al, 1972).

Grande Prairie Trail – 1911 was also the year that the Government of Alberta undertook to cut a trail from Medicine Lodge north to the Athabasca River and then to Grande Prairie. Hundreds of land seekers were headed for Grande Prairie in search of virgin lands and homesteads. The government believed that the Canadian Northern Railway would be building a line to Grande Prairie in the near future and therefore a hand cut trail would suffice for pack horse light wagon travel in the interim.

The project was initiated without any preliminary survey by the Department of Public Works. However, shortly after starting work on the trail north from Medicine Lodge, the Deputy Minister heard reports that the land was not "park-like country" as anticipated, and that trail clearing was taking much longer than expected. After some investigation, the Deputy Minister was persuaded that the "road" should begin at Edson because Edson was already established and had railroad access, and there was nothing at Medicine Lodge. Over the winter that year, the trail building was so difficult that at one point the project stopped. The Grande Prairie settlers petitioned the Premier to continue clearing the trail and the trail did go through. The route was long and hard, and many tales are told of the hardships and accidents incurred along the way (Ahlf, 1986).

An initial digitization of the Medicine Lodge to Athabasca River portion of the trail indicates that a portion of the trail may fall within the boundaries of the Emerson Lakes area of Sundance Provincial Park. More research will be conducted to identify the exact location of the trail and determine if it does lie within the Park boundaries.

Logging Camp – In 1940, a logging camp existed where the Wild Sculpture Trail Day Use Area and parking lot is today. The logging camp included bunkhouses, which were bulldozed and burned by the Alberta Forest Service when the Emerson Creek Road was built in 1969.

3.2.7 Wildlife

The Sundance Valley's abrupt change in topography results in a number of south-facing slopes. This aspect and resulting vegetation provides very good ungulate winter range relative to surrounding landscapes. In addition, the riparian area throughout the length of the Park, is important as habitat for birds, ungulates and other mammals.

Mule and white-tailed deer, elk and moose use the Park and surrounding area for summer and over wintering habitat. Game trails are prevalent throughout the valley bottom with sizeable mineral licks found throughout. The Park is also identified black and grizzly bear habitat. Grizzly bears are known to frequent the Park area.

The Park offers a diversity of habitat for migratory birds and year round residents. Some of these species observed during breeding bird surveys include MacGillivray's, Wilson's, Black and White and Tennessee Warbler; Western Tanager; Barrow's and Common Goldeneye; Common Snipe; Alder and Least Flycatcher; and Chipping, Savannah and Song Sparrow (J. Ficht, J. Wright, pers. comm., 2002). Ospreys are also known to frequent the Sundance Valley area and feed on fish in Beaver and Sundance Lakes. Their characteristic stick nests can be seen high up in the treetops.

3.2.8 Fisheries

Little Sundance and Sundance Lakes have both historically contained populations of northern pike. Historical gill nettings have documented Northern Pike, White Sucker and Trout-Perch in Sundance Lake, while Little Sundance has never been surveyed. Anglers have, however, reported catching Northern Pike in Little Sundance Lake. A small inlet creek at the northeast end of the westernmost basin in Sundance was surveyed in 1971 and been found to contain Northern pike, White Sucker, Longnose Sucker and Spoonhead Sculpin, while a survey on the same creek in 1988 reported only Rainbow Trout fingerlings. The fingerlings likely resulted from the fingerling plants of Rainbow Trout in Sundance Lake in 1987 and 1988 (75,000/year were dropped into the lake using a helicopter and monsoon bucket). Test netting in 1988 failed to capture any Rainbow Trout in the lake, however, and the stocking program was discontinued. The fate of the Rainbow Trout fingerlings in the inlet is unknown, but they may still exist as an introduced population (D. Hildebrandt, pers. comm., 2002).

Sweetgrass Consultants (1994) identified the native sport-fish resource in upper Sundance Creek as one reason that this area was environmentally significant. Historical reports of the Creek indicated Rainbow Trout, Arctic Grayling, Mountain Whitefish and Northern Pike were caught by anglers. In the most recent survey (Johnson and Walker, 1997), 20 anglers were flown into the upper reaches of the creek and, in 48.5 hours of accumulated angling effort, captured five Rainbow Trout, two Arctic Grayling and one Northern Pike. In the same survey, electrofishing of some of the upper reaches obtained Longnose Sucker, Burbot, White Sucker and Spoonhead Sculpin in decreasing order of abundance (Hildebrandt, pers. comm., 2002).

The lower reaches of Sundance Creek upstream and downstream of Hwy #16 have been surveyed more extensively. The most recent survey (1992-93) identified Mountain Whitefish as the predominant sportfish species, followed by Arctic Grayling, Burbot, Brown Trout, Brook Trout, Northern Pike and Rainbow Trout (decreasing order of abundance). Non-sportfish species were dominated by Longnose Sucker, then White Sucker, Longnose Dace, Spoonhead Sculpin and Lake Chub (decreasing order of abundance).

Brook Trout and Brown Trout are introduced populations, but even Rainbow Trout may have been introduced through beaverdam stocking programs of Rainbow and Brook trout in the drainage from the 1920's through the early 1980's. Since then, the Little Sundance Creek beaverdams have not been stocked with Rainbow Trout above and below the old campground on the Swanson Road. However, Brown Trout were stocked in lower Sundance Creek annually from about 1985 to 1995, in the area from Hwy 47 upstream to about Twp 54.

Emerson Lakes contains a native population of White Sucker and has been stocked annually since 1968 with a variety of trout species. The lake is currently stocked with 5000 Brook Trout fingerlings each year and receives steady angling pressure throughout the summer months (due more to the quiet

campground and natural beauty of the lake than to the quality of the fishing). Emerson Creek contains Rainbow and Brook trout. Other species potentially or seasonally encountered are Mountain Whitefish, Arctic Grayling, Bull Trout and non-sport species such as Spoonhead Sculpin, Long-nosed Dace, Longnose Sucker, White Sucker and Burbot.

South Sundance Lake is located within the Sundance Special Management Zone (SMZ). It contains native populations of White Sucker, Flathead Chub and Brook Stickleback, and an introduced population of Brook Trout. About 4000 Brook Trout have been stocked annually since 2001, due to increased angling pressure.

South Sundance and Emerson Lakes are the only water bodies within Sundance Provincial Park or SMZ that are currently stocked or likely to be stocked in the immediate future (D. Hildebrandt, pers. comm., 2002).

3.2.9 Vegetation and Soils

Three major landforms (upland, valley wall, valley floor) are found within the Park. Well-drained uplands, such as those found on the east valley wall along the Hoodoos Trail, are covered by an almost continuous canopy of aspen (*Populus tremuloides*). Associated with this is a developing understory or a co-dominant story of white spruce (*Picea glauca*) and occasionally lodgepole pine (*Pinus contorta*).

The most common understory shrubs include: Canada buffaloberry (*Shepherdia canadensis*), beaked hazelnut (*Corylus cornuta*), alder (*Alnus spp.*), willow (*Salix spp.*), wild raspberry (*Rubus ideaus*), wild rose (*Rosa spp*), and saskatoon (*Amelanchier alnifolia*). Some of the low shrubs include: Labrador tea (*Ledum groenlandicum*) and blueberry (*Vaccinium spp.*). Common herbs and forbs include: twinflower (*Linnea borealis*), wild vetch (*Vicia americana*) and bunchberry (*Cornus canadensis*). Orthic Gray Luvisol soils are found under this vegetative grouping.

As elevation increases within the Park area there are associated vegetation changes. Southeast facing slopes at the crest of the east valley walls show a decrease in aspen and an increase in lodgepole pine and white spruce. There are no discernable changes in undergrowth. Gray Luvisol, and Brunisolic Gray Luvisol soils are found in these areas.

A large portion of the lower Sundance Creek valley bottom consists of poorly drained, depressional areas covered by black spruce (*Picea mariana*) and tamarack (*Larix laricina*), which contain organic deposits commonly 2 to 4 feet deep but occasionally more than 10 feet deep. Undergrowth is comprised of feathermoss with minor amounts of sphagnum moss and some sedge (*Carex* spp.). Soils of these areas are organic and classified as being predominantly Mesisols and Humisols with some Fibrisols (Dumanski et. al, 1972).

A vegetation survey was conducted in August 2001 as a baseline inventory for the development of this management plan (Geographics Dynamic Corp., 2001). The purpose of this vegetation survey was to identify and describe plant community types found within Sundance Provincial Park and the associated Special Management Zone area. Overall, 29 vegetation community associations and 19 vegetation community association complexes were identified. A detailed description of these communities is provided in the vegetation survey report.

3.2.10 Recreation

The Sundance Provincial Park lies in close proximity to the Hamlets of Marlboro and Miller's Lake, and the Towns of Edson and Hinton. For this reason, Sundance Park and surrounding areas to the west and east are attractive to a large number of recreationists for activities such as: hiking, nature appreciation, horseback riding, designated and random camping, fishing, boating,

trapping, OHV , snowshoeing, cross-country skiing, and potentially mountain biking.

Hiking – The Wild Sculpture Trail system receives a moderate level of use from those hiking to the Lake, Hoodoos and Skyline Trails to view the hoodoos, valley and Beaver and Sundance Lakes. Some hikers make a day hike out of the 12 km route from the Wild Sculpture Trail Day Use Area and parking lot, south around the southern tip of Sundance Lake, up the west valley wall to the wellsite parking lot (West Park Foot Access). Some visitors hike south along the Lake Trail all the way to the main pipeline power line, with an overnight stop at one of the backcountry campsites along the way.

Nature Appreciation – Nature appreciation and birdwatching is another reason to visit Sundance Provincial Park. There are survey points within the park that are part of the Breeding Bird Survey of Alberta. There are also nine check stops along a National Breeding Bird Survey route adjacent to the park (J. Ficht, pers. comm., 2002).

Equestrian Use – A small number of equestrian users presently visit the Park. A 35-mile endurance ride occurs annually from the Hornbeck cross-country ski trails about 22 km east of the Park, to a small turn-around loop in the Park. The ride involves about 60 competitors. Few equestrian users ride the full length of the Sundance Valley east ridge trail, from the main pipeline/powerline, north to the Wild Sculpture Trail Day Use Area and parking lot. The Edson Dreamcatchers 4H Club also holds an annual ride. The club usually accesses the Park via the main pipeline/ powerline and rides along the ridge trail. The club enjoys photography and having wiener roasts in the Park.

Camping – Use of the designated backcountry camping sites along the Sundance Lakes is low during the summer. The Emerson Lakes Campground has high use throughout the summer and winter months. A number of random dispersed campsites and vehicle pullouts throughout the Park area are degraded and need reclamation and formalization of use.

Fishing – Fishing opportunities within Emerson Lakes are good. Boaters (motors must be electric) and canoeists enjoy the lakes for their tranquility and beauty.

The Athabasca River Access point is a popular area for fishing and boating. The Athabasca River is a good fishery and experiences high use from this launch point. Local fishermen also access Sundance Lake for fishing with their canoes and small boats. In the past, fishermen used an east-west cutline off the Imperial Road to access the west side of Sundance Lake.

Dandurand Lake is located north of Hwy #16 and just southeast of the boundary of Sundance Provincial Park. It is stocked annually and is a popular fishing hole.

Trapping – Portions of six Registered Fur Management Areas (RFMA) overlap the Sundance Provincial Park boundary. Trapping activities will continue to occur within the Park in cooperation with other permitted recreational uses.

OHV Use – OHV use within the area surrounding Marlboro and Miller's Lake has been identified as very heavy. Residents of Marlboro and Miller's Lake often accessed the Sundance Snowmobile Staging Area and associated trail system to the east of the Park boundary, by crossing a number of cutlines and bridges that are now within the Park.

Winter Sports – Snowshoeing and cross-country skiing are two activities that depend solely on the amount of snowfall in a given year, and the venturesome nature of the participant. At this time these activities are rare within the Park.

Mountain Biking – Few visitors come to Sundance Provincial Park to mountain bike the trails. Generally, the trails are narrow, root-filled and experience significant beaver

activity making them challenging to even the more experienced rider.

4.0 PROVINCIAL PARK ZONING

A zoning system was utilized in the management plan process in order to divide the Park into different zones according to the following factors:

- location of natural and cultural heritage features;
- sensitivity and protection needs of heritage features;
- management objectives and priorities for the site;
- support facilities' requirements to accommodate visitor needs; and
- suitability of the landscape to accommodate particular types and levels of activity/use including the provision of heritage appreciation and outdoor recreation opportunities.

Sundance Provincial Park (comprised of both the Sundance Creek and the Emerson Lakes portions) is divided into five zones: Preservation, Wildland, Facility, Integrated Management, and Access. This zoning provides optimum preservation of natural heritage values. The intents of the five zones are described in the following sections.

See Figure 1. Sundance Provincial Park Map for zoning.

4.1 PRESERVATION ZONE

Preservation Zones are established to ensure the highest possible level of protection of natural and cultural values. The intent of this zone is to preserve land that contains unique natural features or objects of geological, ethnological, historical, anthropological, archaeological, paleontological, cultural or scientific importance. These features or objects are of such significance as to require the special protection provided by this zone.

The sandstone hoodoos and marl fen are provincially significant features that warrant the highest level of protection within Sundance Provincial Park. These zones will be managed with careful consideration of the sensitivity of these features, therefore only foot access will be allowed. No camping, fires, horse, mountain bike or OHV use will be permitted.

The Hoodoos Preservation Zone (township 55, range 21, sections 10,11,15 west of the 5th meridian) begins at the Wild Sculpture Trail Day Use Area, at the north end of the Sundance Creek portion of the Park. The zone continues south along the valley, encompassing Beaver and Little Sundance Lakes, and extends to the northern tip of Big Sundance Lake at Sandstone Campsite (formerly campsite #1). Evidence indicates that the sandy soil composition, and soft, wet areas along the upper and lower hoodoos trail, can be easily damaged by the horse impacts and increased visitor use. Only foot travel will be permitted in order to ensure that the unique hoodoo formations are preserved for future generations to visit, photograph and enjoy.

The Marl Fen Preservation Zone (township 53, range 19, section 19,west of the 5th meridian) is located at the southern end of the Sundance Creek portion of the Park. Access to this area is by foot only. In order to preserve this unique area and manage increased use and public safety, a suspended boardwalk interpretive trail system (similar to that at the Wagner Natural Area) is highly recommended. The perimeter of the Preservation Zone should be well marked and fences erected where necessary.

4.2 WILDLAND ZONE

The intent of the Wildland Zone is to protect and maintain the area's natural state. This zone applies to most of Sundance Provincial Park in both the Emerson Lakes and Sundance Creek portions. Management will sustain or enhance wilderness recreation

opportunities under primitive conditions. Development is limited to primitive backcountry facilities suited to a wildland experience. Motorized activity is not permitted. Recreational activities will be managed to reduce impact on ecologically sensitive sites (e.g., Emerson and Sundance Lakes and associated riparian areas).

Within the Sundance Creek portion of the park, Sundance Lake and its associated riparian habitat and watershed, is a significant Park feature. Evidence indicates that sandy soil composition, and soft, wet areas of lake riparian habitat can be easily damaged by the horse impacts and increased visitor use. The Lake Trail from Sandstone Campsite (formerly campsite #1) southward runs close to Sundance Lake through soft, wet areas with natural sinkholes and heavy beaver runs. For this reason the Lake Trail from the Sandstone Campsite to the Second Narrows Campsite (formerly campsite #3) is designated for foot access only.

In order to preserve the hoodoos and riparian habitat along the Hoodoos and Lake Trails, while accommodating horseback use within the Park, an Upper Ridge Equestrian Trail, around the Hoodoos Preservation Zone, will be established.

The Upper Ridge Equestrian Trail will begin at a staging area located south of the Emerson Creek Road, and east of the Wild Sculpture Trail Day Use Area and parking lot. The exact location of the staging area will be finalized by Alberta Community Development, in cooperation with the local oil & gas and forestry companies, at the time of development. The beginning of the Upper Ridge Equestrian trail will likely follow an existing resource road and then continue southwest along an existing cutline to the valley ridge, just outside the Park boundary (see Park map). At this point, equestrian hitching rails will be installed to offer the equestrian user an opportunity to dismount, tie their horse, and walk a short distance to view the hoodoos, before continuing southeast along the ridge trail.

From the hitching rails site, the trail will continue southeast along the ridge approximately 8.6 km to a junction point east of the southern tip of Sundance Lake. At this junction, the trail will turn and gradually switchback down into the valley to connect with the Lake Trail. At the junction with the Lake Trail, the horse user has the option of traveling a short distance to a horse camp for a short rest or overnight stay, or continuing southeast down the valley.

The horse camp will be established just south of Sundance Lake at the existing non-formalized horse campsite (currently marked by red spraypainted horseshoes hanging in the trees). This horse camp will be upgraded to a permanent overnight campsite with a firepit, picnic table, outhouse and horse corrals. The designated horse camp will be named Horseshoe Grove Equestrian Camp.

From the Horseshoe Grove Equestrian Camp, the equestrian trail continues 3.2 km along the valley to a junction where the trail switchbacks up to the ridge. Horseback riders have long used this switchback trail. From this point, the equestrian route continues south along the ridge to the main east-west pipeline/powerline which connects to the Swanson Road. This entire trail, from the staging area off the Emerson Creek Road to the Swanson Road, offers a loop route with excellent viewpoints, overnight camping at Horseshoe Grove Equestrian Camp, hitching rails and horse holding facilities for the equestrian user.

The Park map indicates the approximate Upper Ridge Equestrian Trail route. Field reconnaissance will be used to determine the final trail location, trail upgrades and signage, based on soil conditions and suitability to support moderate equestrian use. In the event of unsuitable soils, high water table, sensitive or rare plants, and challenging topographic features (e.g. expansive creek draws east of the valley ridge), portions of this Upper Ridge trail may have to be re-routed to the lower valley.

The Wildland Zone will apply to the majority of the Emerson Lakes area excluding the Facility Zone.

4.3 FACILITY ZONE

The intent of the Facility Zone is to provide an area capable of withstanding intensive visitor use for outdoor recreation activities and facilities. The Facility Zone is located in the Emerson Lakes portion of the Park. This zone applies to the Emerson Lakes Campground area including the road, campsites, and boat launch. This zone will also apply to the Athabasca River Access Day Use and hand boat launch area, as well as the Emerson Creek Day Use Area (across from the junction of the Emerson Creek Road with the Imperial Road).

4.4 INTEGRATED MANAGEMENT ZONE

In recognition of the pre-existing motorized recreational use in the area, and in consideration of the strong desire identified by the public to maintain a circular year-round motorized access route crossing the long, linear Sundance Creek portion of the Park, two designated OHV access corridors will be established: one corridor is located towards the south end of the Park connecting Miller's Lake and Marlboro to surrounding areas, and a second corridor runs across the middle of the Park.

The Integrated Management Zone designation will apply to the two designated OHV corridors across Sundance Provincial Park. Land and snow OHV use on these trails is restricted to vehicles with a curb weight of 590kg (1300lb) or less, tire pressure of 110Kpa (16psi) or less, wheel base of 1.85m (73") or less, and width of 1.78m (70") or less.

The southern designated summer and winter OHV route heads north from the Miller's Lake West Access Road, along the county right of way between sections 17 and 18 of township 53, range 19, west of the 5th meridian. The trail then heads southeast past an old trapper's cabin along an upland aspen stand, and winds to head northeast crossing Sundance Creek (Rupert's Bridge). Across Sundance Creek, the trail heads northeast to join a wide cutline (between sections 17 and 20) that heads east to join the Swanson Road and Sundance Snowmobile Staging Area[4].

The second designated summer and winter OHV route transects the middle of the Sundance Creek portion. This trail heads west along the main pipeline/powerline through the northern halves of sections 13, 14 and 15 of township 54, range 20, west of the 5th meridian. The trail continues down, crosses Sundance Creek, and continues up the west ridge. From here, travelers can continue northwest along the main pipeline/powerline, or continue southwest along an adjoining cutline that connects to a network of trails on the west side of the Park. Alberta Community Development will work cooperatively with the pipeline and powerline lease holders to negotiate use of the right of way, and to determine the best location for this second designated OHV trail. Trail placement will minimize slope steepness and mitigate erosion. Alberta Community Development will erect a new OHV bridge across Sundance Creek. The bridge location will be determined at the time of construction to minimize impacts to the riparian habitat and adjacent vegetation.

4.5 ACCESS ZONE

The intent of the Access Zone is to provide a safe and convenient access to outdoor recreational opportunities and associated facilities. This zone applies to the Emerson Creek Road, a major access route through the Provincial Park. The Emerson Creek Road runs through the Emerson Lakes portion of Sundance Park and serves as the

[4] The Sundance Snowmobile Staging Area is managed by the Land and Forest Service, Alberta Sustainable Resource Development.

northern boundary of the Sundance Valley area of the Park. Hinton Wood Products has a license of occupation for this road and therefore is responsible for the road maintenance.

5.0 MANAGEMENT OBJECTIVES AND ACTIONS REQUIRED

The overall intent of Sundance Provincial Park is to ensure that the health, biodiversity and uniqueness of this ecosystem are maintained, by managing activities such that they are compatible with long-term conservation.

For the most part, natural processes in Sundance Provincial Park will be allowed to continue without management interference. The exception to non-interference is fire suppression and management of diseases and pests, which threaten adjacent forests as well as recreational values inside the Park. Other human interventions, such as fishing and trapping, will be sustainably managed.

The natural environment of the Park is mostly self-maintaining, therefore the focus of management will be on control of human use and its impacts on the Park environment. Management guidelines ensure that these activities and impacts do not exceed sustainable levels.

The following sections outline the objectives and actions required to achieve the management objectives for Sundance Provincial Park, and meet the four goals of preservation, heritage appreciation, outdoor recreation and heritage tourism.

5.1 PRESERVATION

The description of the **Preservation Goal** for Provincial Parks is:

"Provincial Parks preserve and protect a system of provincially significant natural landscapes incorporating the greatest possible diversity of natural heritage as well as landscape related prehistorical and historical resources."

5.1.1 Systems Related

Objectives:

1. To manage Sundance Provincial Park (SPP) as a functioning subsystem of the larger upper and lower foothills subsystems in the overall Foothills Natural Region.
2. To preserve representative, unique, rare and endangered plant and animal species and communities and gene pools found within SPP.
3. To gain knowledge and understanding of the natural resources and their functions within the SPP ecosystem.

Actions:

- Complete inventories and research activities that encompass the entire SPP.

5.1.2 Geology/Soils/Landform

Objectives:

1. To protect significant geomorphological features within SPP.
2. To prevent degradation of soils and landforms (e.g., the sandstone hoodoos) by human activity within SPP.
3. To prevent the unlawful removal of and damage to geological specimens and natural materials (e.g., hoodoo formations or petrified wood) within SPP.

Actions:

- Identify and protect significant geomorphological features within SPP (i.e. specifically within the Emerson Lakes area).
- SPP trails will be monitored for deterioration, and hardened-off, rerouted, or reclaimed when necessary.
- SPP will be monitored for theft and vandalism of geological items and natural materials (particularly the hoodoos).

5.1.3 Vegetation

Objectives:

1. To protect significant SPP vegetative features.
2. To maintain the health and productive capacity of the Marl Fen (located within SPP) to support a diversity of carnivorous and rare plants.
3. To allow the forest within SPP to follow natural succession (e.g. wildfire, diseases) except where there is threat to public safety or adjacent lands.
4. To prevent exotic (non-native) species, or noxious and restricted weeds, from establishing within SPP.
5. To minimize disturbance to natural plant communities within SPP.
6. To encourage public appreciation and awareness of plant communities within SPP and their sensitivity to disturbance (particularly in the Marl Fen, freshwater springs and wetland areas adjacent to Sundance Creek).

Actions:

- Identify and protect significant vegetative features and plant communities within SPP, particularly in and around the Marl Fen, freshwater areas, and riparian habitats along Sundance Lake and Valley.
- Implement a comprehensive evaluation of the rare plants within SPP to identify significant habitats and sensitive areas.
- Develop a monitoring program to track rare plant species and significant plant communities specific to the study area.
- Reclaim areas where human use has caused unacceptable disturbance.
- Use education and legislation to control picking of vegetation or collection of seeds, unless authorized under special permit or for research.
- Monitor staging and camping areas that are sensitive to trampling. Develop strategies to manage and minimize impacts.
- Identify and monitor the presence of exotic, noxious or restricted vegetation.
- Develop a long-term vegetation management strategy, with specific consideration for the Marl Fen and freshwater springs area.
- Develop a disease and insect outbreak plan. The plan should assess threats to wildlife habitat, rare plant communities and adjacent lands, but also recognize that insects and their natural predators contribute to the biodiversity and resilience of the ecosystem.
- Develop a wildfire management plan.
- Develop an education strategy to inform the public of the sensitivity of the Marl Fen, freshwater springs and riparian areas adjacent to Sundance Lake and Sundance Creek, to human impacts.
- If parcels of land west of the Marl Fen Preservation Zone become available for sale, Alberta Community Development will make efforts to purchase them to be included in the Park. These adjacent fen lands are an important component of the Marl Fen area hydrology and would be an important addition to the Park.

5.1.4 Wildlife

Objectives:

1. To maintain and preserve the natural diversity of wildlife species and populations within SPP.
2. To protect the diversity of habitats for wildlife (e.g., black and grizzly bears, moose, elk, and osprey) within SPP.
3. To ensure regional movement corridors between SPP and adjacent landscapes remain effective for the species that require them.
4. To manage human and recreational use (e.g., placement of trails) to be compatible with the conservation of wildlife species within the SPP.
5. To encourage low-impact scientific studies that contribute to the biodiversity database for SPP (e.g., research into the abundance of amphibians).

Actions:

- Identify and protect the diversity of wildlife habitats within SPP.
- Monitor the use of SPP and the valley by wildlife (i.e., determine number of species, number of individuals and primary use areas).
- Cooperate with adjacent land managers to develop common objectives to manage wildlife populations (e.g., black and grizzly bear, moose and elk).
- Prohibit motorized recreational use except as defined within the Sundance Provincial Park Zoning.

5.1.5 Water, Springs and Riparian Habitat Management

Objectives:

1. To manage and maintain the health and flow of the freshwater springs and streams within SPP.
2. To maintain the productive capacities of SPP habitats to support healthy and diverse fish resources.
3. To maintain the abundance and diversity of fish at the carrying capacity of the habitat within SPP.
4. To maintain foot access to the bubbling springs (located within SPP) for water collection by local public and residents.

Actions:

- Monitor hydrologic qualities such as flow regimes, profiles, fecal count, giardia, pH, hardness and turbidity, along SPP water sources, especially the Marl Fen springs, to ensure that the qualities are not being adversely affected by anthropogenic activities.
- Assess riparian health where human use is concentrated.
- Alberta Community Development will work cooperatively with the local FMA holder and Alberta Sustainable Resource Development to explore options to restore the natural flow of Emerson Creek (where it flows under the Emerson Creek Road).

5.1.6 Aesthetic Resource Management

Lands adjacent to Sundance Provincial Park experience intensive industrial and recreational land use activities. Drastic changes in typography characterize the Sundance Valley area. Due to the fact that hiking trails along the upper ridge of the Park allow for expansive views and detailed line of sight, management of aesthetic resources adjacent to the Park is important to the quality of the visitor experience.

Objectives:

1. To manage the visual integrity of SPP.

Actions:

- Designate, design and manage trails to consider aesthetic values in order to have the least negative visual impact for the visitor (e.g., minimize lines of sight to cutblocks and clearings).
- Work with adjacent land users through disposition conditions, Special Management Zone Guidelines, and approvals, to mitigate visual impacts.
- Work cooperatively with adjacent land and resource managers to minimize visual impacts (that are within the control of SPP management) due to recreational and industrial activities.
- Develop facilities that maintain the visual integrity of the Provincial Park and natural environment.

5.1.7 Pollution Management

Objectives:

1. To manage (when within the control of SPP management) noise impacts within existing standards, or if possible to improve the standards, for recreational and industrial activities.

Actions:

- Alberta Community Development will work cooperatively with adjacent land and resource managers through approval conditions to help mitigate noise impacts and air pollution.

- Alberta Community Development will seek assistance from Alberta Environment to regularly monitor air quality.

5.1.8 Mineral Resource Management

Objectives:

1. To ensure that protection of the ecological integrity of the SPP ecosystem is the prime consideration when honouring existing mineral rights.
2. To cooperate with industry to ensure that the interests of SPP are discussed so that potential negative impacts are eliminated, reduced or mitigated to the greatest extent feasible.

Actions:

- Access limitations and site-specific restrictions will be applied on leases occurring on sensitive sites within SPP.
- New dispositions processed in the SPP after April 28, 1999 (the date of park establishment) will have "no surface access".
- All surface access dispositions will be subject to the *Provincial Parks Act* and *Dispositions Regulations*.
- Applications for surface dispositions within SPP will be reviewed to determine impacts of any proposed development on the vegetation, wildlife and fisheries resources, as well as recreation. These impacts must be thoroughly assessed by the proponent and the information provided for both government and public review prior to any approvals being issued.
- Alberta Community Development staff will meet with lease holders to discuss future requirements and conditions.
- Access approval for leaseholder activity will be based on minimizing environmental and recreational impacts, such as by using existing access corridors. The method of access will be restricted (e.g., the *Provincial Parks Act* prohibits unauthorized aircraft landings in the Provincial Park).
- Geophysical exploration within SPP will be subject to the following conditions:
  - All exploration work will utilize heli-portable or under canopy zero-impact methods only. Line of site cutting is not permitted.
  - Seasonal restrictions may apply to all activities.
  - Existing access will be used whenever possible.
  - In environmentally sensitive areas, exploration will be allowed to proceed only if minimal surface disturbance will occur.
  - No new access points for seismic will be made in SPP.
  - Support vehicles are restricted to areas outside the SPP.
  - No equipment servicing is allowed in SPP.
  - No structures can be built within SPP.
  - All surface disturbances will be completely reclaimed to conform to surrounding land uses and landscapes. This action includes leases established prior to the area being designated as Sundance Provincial Park.

5.1.9 Special Management Zone

A 500-metre Special Management Zone (SMZ) surrounds Sundance Provincial Park. The purpose of this zone is to protect the ecological integrity of this Park without unduly restricting industrial activity. This has been accomplished with a Protective Notation (PNT) and set of SMZ Guidelines. These guidelines have been placed under LSAS (Land Status Automated System)[5] in the Administration Remarks Field. Any access, timber harvesting, silviculture or petroleum and natural gas activities that occur on lands within 500 metres of the boundary of Sundance Provincial Park are subject to the restrictions and exceptions noted within these guidelines. See Appendix II for detailed guidelines.

[5] LSAS contains Alberta Surface Public Land and Crown Mineral dispositions and activities.

Objectives:

1. To manage all activities within the SMZ to be consistent with the SMZ Guidelines, as well as with preserving the ecological integrity of SPP.
2. To work cooperatively with other government agencies and adjacent land managers to ensure that the SMZ Guidelines are applied consistently and in accordance with their intent.

Actions

- Use the principles of adaptive management to refine or change the SMZ Guidelines to reflect new knowledge and techniques that will ensure site protection.

5.1.10 Grazing

SPP contains one grazing lease that expires in 2006.

Objectives:

1. To manage grazing activity within the SPP to be compatible with the experiences and opportunities sought by Park visitors, as well as the preservation of significant and vegetative features.

Actions

- Identify significant vegetative features within the grazing lease area.
- Conduct a grazing impact assessment to determine the nature and extent of impact within SPP.
- Assess and determine whether a grazing permit should be re-issued on an annual basis according to provisions under the *Provincial Parks Act*.

5.1.11 Research

Objectives:

1. To ensure that all research is conducted in a low-impact manner that is appropriate within a Provincial Park.
2. To gain clear knowledge of the SPP and area features (e.g., hydrology, flora and fauna).
3. To support and cooperate in research programs with other government, non-government, industry and public organizations.
4. To seek research projects geared toward gaps in existing information for SPP.
5. To ensure all research is completed using "ethical standards", such as those used by the University of Alberta.
6. To encourage a rare plant study within SPP, with a focus on the Marl Fen area.
7. To encourage a hydrologic study to determine the significance of the freshwater springs and groundwater flows within and adjacent to the Marl Fen area. If necessary, Alberta Community Development will use the study findings to adjust the boundaries of the Marl Fen Preservation Zone.

Actions:

- Gather, list and map the distribution of completed studies/theses for the SPP areas.
- Identify existing information gaps.
- Devise a strategy to identify funding sources, and encourage volunteer, corporate and government involvement in initiating biophysical research within SPP.
- Coordinate past and proposed research projects both within SPP and in surrounding areas.
- Research permits must be obtained prior to conducting research activity.

5.1.12 Administration, Maintenance and Operational Support

Objectives:

1. To ensure administration, maintenance and operational activities support long-term management objectives and actions outlined in this management plan.
2. To continue to work cooperatively with operating organizations, volunteers and local public on Park maintenance, operations and fulfillment of management objectives.

5.1.13 Cultural Resources

Objectives:

1. To manage and protect significant cultural features of SPP.

Actions:

- Identify and protect significant cultural and historical sites and features in SPP (e.g., abandoned trapper's cabin east of Sundance Creek).
- Inventory and assess cultural resources for educational potential, scientific needs, and protective status.

5.1.14 Volunteer Management

Objectives:

1. To provide opportunities for individuals and organizations to assist in managing and protecting SPP's natural, cultural and recreational resources.
2. To maintain existing, and encourage new, volunteer relationships (e.g., Edson and Hinton ATV Clubs, Edson Snoseekers, Edson and District 4H Club, Hinton Wood Products and Weyerhaeuser Company Ltd.).
3. Encourage the public to help in reporting Provincial Park violations (e.g., defacing, destroying, theft and misuse of SPP resources).

5.2 HERITAGE APPRECIATION

The **Heritage Appreciation Goal** for Provincial Parks is:

"Provincial Parks provide opportunities for exploration, understanding and appreciation of natural heritage supported by a range of interpretive and educational programs."

5.2.1 Interpretation

There are some key access points and areas inside and outside of Sundance Park that offer excellent opportunities to erect interpretive signs/kiosks to educate area visitors and recreationists about the Park's significant features and recreational opportunities. These key locations include: the viewpoint along the Swanson Road; Dandurand Lake (just to the southeast of the Park boundary); the West Park Foot Access Point (wellsite); the bridge at the Athabasca River Access Day Use Area; the Wild Sculpture Trail Day Use Area; along the Wild Sculpture Trail System; the Sundance Lake Southwest Foot Access Point; the old trapper's cabin along the designated southern OHV corridor; the OHV staging areas off the Swanson Road; and the Equestrian Staging Area south of the Emerson Creek Road.

Objectives:

1. To allow for structured and unstructured appreciation of SPP's natural heritage.
2. To ensure that visitor services balance SPP's preservation and outdoor recreation/tourism goals.
3. To ensure that special events are appropriate within the Sundance Provincial Park mandate and consistent with provincial policies.
4. To encourage visitors to explore the Park and learn first-hand about its natural and cultural heritage.
5. To work cooperatively with adjacent land/resource managers [e.g., Hinton Wood Products, Weyerhaeuser Company Ltd., Talisman Energy] on communication to increase public knowledge, appreciation and understanding of SPP's features.

Actions:

- Determine the most suitable interpretive program design, including physical structures, signs, communications products etc. for the Marl Fen Preservation Zone. (e.g., suspended interpretive boardwalk similar to the Wagner Natural Area).
- Develop interpretive signs and brochures for the Marl Fen Preservation Zone explaining the significance and sensitivity of the area.

- Develop a general Sundance Provincial Park visitor brochure with map, that explains and encourages appreciation and protection of the Park's natural and cultural features. The brochure will identify the flora, fauna and geologic significance of SPP.
- Develop maps, signs, and brochures showing major trails and access points, including the types of recreational activities permitted within the Park.
- Develop and erect an information kiosk and/or signs, including a trail map with key Park messages at: the viewpoint along the Swanson Road; West Park Foot Access (wellsite); bridge at the Athabasca River Access Day Use Area; Wild Sculpture Trail Day Use Area; points along the Wild Sculpture Trail System; OHV staging areas off the Swanson Road (i.e., at its junction with the main pipeline/powerline and its junction with the Snowmobile Staging area); and the Equestrian Staging Area (south of the Emerson Creek Road).
- Assess and if needed erect strategically placed interpretive signage/ kiosks at: Dandurand Lake, the Foot Access Point to Sundance Lake Southwest, and the old trapper's cabin along the designated southern OHV corridor.

5.2.2 Historic

Objectives:

1. To preserve historic resources within Sundance Provincial Park.

Actions:

- Research historical accounts and explore opportunities to upgrade and maintain the historic (pre-1950's) hiking route south of the main pipeline/powerline.
- Conduct further research and digitize historic maps to determine the exact location of the historic Grande Prairie Trail. If the trail is located within the Park boundaries, then it will be added to the Park map and interpretive signage and communications materials may be considered.

5.3 OUTDOOR RECREATION

The **Outdoor Recreation Management Goal** for Provincial Parks is as follows:

"Provincial Parks provide auto access and backcountry opportunities for outdoor recreation to the extent that the activities are compatible with the preservation of natural heritage values."

5.3.1 General Outdoor Recreation Management

It is understood that with human population growth, increases in outdoor nature-based recreation, and a greater awareness of Sundance Provincial Park, user levels within SPP will increase. The Park's management will reflect these changes and adapt to the need for better facilities. The development of new facilities will be consistent with the primary preservation goal and visual integrity of the Provincial Park and natural environment.

Objectives:

1. To gain an understanding of recreational use patterns within SPP over time.
2. To gain an understanding of the recreational capabilities of specific areas within SPP (e.g., Lake, Hoodoos and Skyline Trails).
3. To provide a variety of environmentally appropriate day use and overnight recreational opportunities within SPP.
4. To manage SPP recreational activities to minimize user conflicts.
5. To encourage all visitors to SPP, through education and information, to practice low-impact recreational behaviors that respect the environment and other users.
6. To fully consider social and environmental consequences when planning and providing backcountry facilities in SPP (i.e., to preserve the area's ecological integrity and to ensure high-quality visitor experiences).

7. To provide recreational opportunities that are consistent with the SPP mandate and can be feasibly managed with existing resources.

Actions:

- Assess the levels and types of recreational use and their associated impacts to the ecosystem(s) within SPP.
- Maintain trailheads, trails, access, staging, day use and campsite areas for their designated activities within SPP.
- Monitor environmental impacts of activities and appropriately mitigate and/or reclaim any damages.
- Adapt to increases in SPP user levels by providing appropriate facilities necessary to protect the integrity of the natural environment (e.g., toilets, parking lots, hardened-off campsites).
- Promote low-impact backcountry user ethics.
- Development of backcountry facilities in SPP will be limited to trails, boardwalks, trail bridges, two OHV bridges, designated backcountry campsites, horse holding facilities, and horse tie-ups. Locations and landscape are to be chosen for site sensitivity and appropriateness.
- Implement a voluntary visitor survey system within SPP to assess use levels, patterns, trends and views.
- Limit recreational activities in sensitive features/areas of SPP.

5.3.2 General Access Management

Objectives:

1. To protect the unique ecosystems within SPP through sensitively managed access areas, staging areas, routes and methods.
2. To provide trails for muscular powered (non-motorized) users.
3. To provide staging areas for muscular powered (non-motorized) users.
4. To provide two summer and winter OHV access corridors across Sundance Provincial Park.
5. To allow helicopter landing only for emergency or government-approved management purposes.

Actions:

- Designate formal trails/sites within SPP when warranted by user levels and impacts.
- Manage two designated corridors for OHV access across SPP.
- Educate the public about access opportunities and regulations for SPP.

5.3.3 Facility and Trails Management

Fox Creek Developments through Hinton Wood Products is operating under agreement with Alberta Community Development to maintain and upgrade facilities, campsites and trails within Sundance Provincial Park and other parks within the region (Hinton Forest Resources, 2002). Specifically, Hinton Wood Products will make upgrades to the Emerson Lakes Trail System located at the Emerson Lakes Campground and to the Wild Sculpture Trail System located along the eastern ridge of Sundance Valley.

Objectives:

1. To encourage SPP users to stay on designated trails and be considerate of other users, sensitive areas and vegetation.
2. To understand existing use and condition of SPP trails.
3. To ensure minimal environmental impacts, SPP trails may be closed or re-routed to allow for adequate regeneration and preservation.
4. To promote trail etiquette within SPP.

Actions:

- Identify the main trails within SPP.
- Assess existing trail uses and conditions.
- Where required, reclaim designated and undesignated trails according to environmental impacts and user levels.
- Sign all designated trails within the Park and all other trails where required.

- Develop trail guidelines, brochures and maps to help users enjoy SPP.
- The bridge at the southern end of Sundance Lake will be repaired and maintained for foot use only.
- Existing bridges within SPP will remain and their use encouraged by muscular (horse and hiker) travel only.
- Enforcement and compliance of non-motorized use on existing trails and bridges within the Park will continue to be an area of enforcement focus.
- Alberta Community Development will work cooperatively with local landowners, resource managers and Yellowhead County to build a parking facility at the Marl Fen access point.

5.3.4 Hiking

The main hiking trails within the Provincial Park are as follows: along the Hoodoos and Lake Trails from the Wild Sculpture Trail Day Use Area to the southern tip of Sundance lake; from the southern tip of Sundance Lake west up the slope to the wellsite access (West Park Foot Access); south from the southern tip of Sundance Lake in the valley to the main pipeline/powerline; and along the trail system around Emerson Lakes.

Objectives:

1. To provide opportunities for hiking within SPP.
2. To manage SPP trails for ease of visitor use and public safety.
3. To identify and encourage hiking trails south of the pipeline/powerline.

Actions:

- Identify trails for hiking, and provide information on distance, elevation gain and difficulty levels.
- Hiking trail maintenance and upgrades will be limited to designated trails as identified on the Park map. All other undesignated trails and cutlines within the Park will not be maintained and use is not recommended (use at own risk).
- If deemed necessary, some undesignated trails, or portions of them, may be closed and reclaimed.
- Identify and maintain the Lake, Hoodoos and Skyline Trails (which make up the Wild Sculpture Trail System) within the Hoodoos Preservation Zone for hiking only.
- Identify and maintain the access point (wellsite) on the west side of the Park as the staging area for foot access only and named West Park Foot Access.
- Identify and maintain the Lake Trail from Sandstone Campsite south along Sundance Lake to the Second Narrows Campsite for hiking only.
- Identify and maintain the trail system around Emerson Lakes for hiking only.
- Trails around Emerson Lakes will be actively maintained to prevent flooding due to increased beaver activity.
- Identify and maintain the east-west cutline off the Medicine Lodge Road from the designated access point for foot access only to Sundance Lake Southwest. Name this access point Sundance Lake Southwest Foot Access.

5.3.5 Camping

Objectives:

1. To provide opportunities for auto access camping and designated backcountry camping within SPP.
2. To minimize conflicts between campers and bears.
3. To promote low-impact camping ethics and standards (with a focus on the backcountry).
4. To formalize areas that experience high use, to ensure site preservation and maintain recreational opportunities for Park visitors.

Actions:

- Campers shall adhere to low-impact camping ethics and standards, especially in the backcountry, to prevent the degradation of the Park's ecosystem, and wildlife conflicts.

- Horse and hiker camping areas will be separated.
- Identify and maintain campsite #1 along Sundance Lake as Sandstone Campsite.
- Identify and maintain campsite #2 along Sundance Lake as First Narrows Campsite.
- Identify and maintain campsite #3 along Sundance Lake as Second Narrows Campsite.
- Identify, develop and maintain an equestrian camp at the southern end of Sundance Lake. Name this camp Horseshoe Grove Equestrian Camp.
- Users will be educated about separating their sleeping and eating areas in order to minimize bear/human conflicts. Where possible, steel bear proof lockers, similar to those in Kananaskis Country (e.g., Ribbon Falls), will be provided. When possible, campsites will not be located near identified bear movement corridors or prime bear habitat.
- Fires are only permitted within fire pits or fireplaces. These structures are associated with designated backcountry campsites, auto access campgrounds and day use areas.
- No random fires are permitted within SPP.
- No random camping is permitted.
- Fire pits must be properly used to reduce risk of forest fires. During high or extreme fire hazard, a fire ban may be implemented.
- There will be no camping within the Hoodoos or Marl Fen Preservation Zones.
- Campsites will be monitored for environmental impacts and deterioration using set criteria. Sites will be reclaimed and moved when necessary. Hardening off of sites will occur if user levels exceed site carrying capacity.
- Upgrade and manage the area, directly off the road to the Emerson Lakes Campground, as a permanent group use campsite. This site will be available for use by reservation.

5.3.6 Day Use

Hiking is a popular day use activity and the Hoodoos is a primary destination of local visitors from Edson and Hinton. The Lake, Hoodoos and Skyline Trails are recommended for day use. A loop route from the Wild Sculpture Trail Day Use Area around the southern end of the lake to the wellsite (West Park Foot Access) on the west ridge and boundary of the Park, is recommended as a great day hike for the more experienced hiker. This route is about 12 km in length. Picnics, boating and fishing are also popular activities at the Emerson Lakes Campground and Athabasca River Access Day Use Area.

Objectives:

1. To provide opportunity for day use in SPP.
2. To promote certain trails and facility areas for day use in SPP.
3. To adapt with increases in SPP user levels by providing needed and appropriate facilities (e.g., toilets, picnic tables and parking lots).

Actions:

- Identify, maintain and manage the Athabasca River Access Area for day use in SPP. Name this area the Athabasca River Access Day Use Area. No overnight camping will be permitted. A single boat launch will be provided. Hand launching of boats will be permitted only.
- Identify and manage the access area at Emerson Creek, 11.8 km west of the Wild Sculpture Trail Day Use Area and parking lot, for day use only. Name this area the Emerson Creek Day Use area. The day use restriction is to ensure protection of the stream flow and fish habitat.
- Develop the Athabasca River and Emerson Creek sites to day use facility standards (e.g., installing picnic tables, garbage bins, outhouses and fire pits).

- Facilitate Park user surveys to gather information on the type and level of recreational use within SPP.
- Identify the Lake, Hoodoos and Skyline Trails for day use hiking.
- Identify the 12 km route from the parking lot along the Lake Trail around the southern tip of Sundance Lake to the wellsite on the west ridge, for day use hiking.

5.3.7 Equestrian Use

Objectives:

1. To provide opportunities for horse use while minimizing environmental impacts, conflicts between users, and impacts on wildlife and their habitats.
2. To ensure public safety and to avoid competition and/or conflict with wildlife. Horses and pack animals will be controlled by the owner/operator at all times when in SPP.

Actions:

- Monitor and assess the ability of the existing SPP trails to support horse use.
- Identify and designate equestrian trails and staging areas where necessary.
- Identify, develop and maintain an Equestrian Staging Area south of the Emerson Creek Road (east of the Wild Sculpture Trail Day Use Area and parking lot). Alberta Community Development will work cooperatively with Alberta Sustainable Resource Development as well as the oil & gas and forestry companies to determine the exact location of the Staging Area. Where possible, existing clearings and resource roads will be utilized.
- Install horse hitching rails northeast of Hoodoos Preservation Zone (see map).
- Identify and maintain the Upper Ridge Equestrian Trail around the Hoodoos Preservation Zone as the designated horse route within SPP (see map for approximate trail location). The equestrian route will begin at the Upper Ridge Equestrian Staging Area and head southeast to the hitching rails just outside the Park boundary. Within the Park, the designated equestrian route follows the east valley ridge, enters the valley at a junction southeast of the southern tip of Sundance Lake, continues along the valley bottom to a series of switchbacks that head up the valley wall to the ridge, and south to the main pipeline/powerline. Alberta Community Development will work cooperatively with Alberta Sustainable Resource Development to determine the exact trail location. The trail location will be developed at the time of field reconnaissance, trail upgrades and trail signing, and will depend on soil conditions and suitability for moderate equestrian use. In areas of unsuitable soils, high water table, sensitive or rare plants, or challenging topographic features (e.g., expansive creek draws east of the valley ridge), portions of the Trail may be re-routed to the lower valley.
- Develop primitive holding facilities, as necessary to protect the environment, in cooperation with local outfitters and related association(s).
- Upgrade the non-formalized horse camp south of Sundance Lake (see map) to a permanent overnight horse camp with fire pit, picnic table, outhouse and horse corrals. Name this horse camp the Horseshoe Grove Equestrian Camp.
- Identify the main pipeline/powerline right-of-way on the west side of the Swanson Road as a staging area for horse use into the Park. Alberta Community Development will work cooperatively with the pipeline and powerline lease holders to negotiate use of the pipeline/power line right of way, and to determine the best location for the Equestrian Staging Area.
- Implement a weed-free hay program for all horses using the SPP staging areas.
- Public education programs for SPP users will provide information on approaching horses, what to do and say, horse and hikers recreating together, etc. These

key messages will be included in park brochures.

5.3.8 Motorized Access

Motorized OHV access is only permitted along the two designated OHV corridors within the Park: 1) towards the south end of the Park connecting Miller's Lake and Marlboro to surrounding areas, and 2) across the middle of the Park (see Park map). Land and snow access is restricted to vehicles with a curb weight of 590kg (1300lb) or less; tire pressure of 110Kpa (16psi) or less; wheel base of 1.85m (73") or less; and width of 1.78m (70") or less.

Objectives:

1. To manage two OHV access corridors across the Park while minimizing impacts on the natural environment and conflicts with other users.
2. To manage for illegal entry of motorized vehicles into the Park and reclaim damaged Park lands.
3. To educate OHV users about where OHV use is permitted and not permitted within SPP.

Actions:

- Designated OHV corridors will be clearly signed with access regulations and permitted uses, and regularly maintained.
- All former OHV trails within the Park will be reclaimed, and clearly signed to provide access regulations and permitted (non-OHV) uses.
- Alberta Community Development will work cooperatively with area FMA holders to discourage OHV access conflicts.
- Natural barriers will be erected in areas used by OHVs to prevent illegal entry into the Park.
- Alberta Community Development will work cooperatively with trapline holders to reclaim old access routes.
- Rupert's Bridge crossing will be upgraded and maintained as a designated OHV access corridor for OHV use across the Park.
- The main pipeline/powerline will be upgraded and maintained as the second designated OHV access corridor for OHV use across the Park.
- Alberta Community Development will work cooperatively with the pipeline and powerline lease holders to negotiate use of the pipeline/powerline right of way, and to determine the best location for the designated OHV trail.
- To identify the east-west trail (cutline) off the Imperial Road to the Sundance Lake Southwest Foot Access.
- To identify and designate the continuation of the east-west trail from the Sundance Lake Southwest Foot Access Point, down to the lake, for foot access only (see Park map).
- Alberta Community Development will work cooperatively with local OHV clubs, groups and users to educate OHV users about the reasons for OHV restrictions in the Park, and on the roper use of designated OHV corridors.
- Alberta Community Development will work cooperatively with local OHV clubs and users to encourage stewardship and participation in the development and maintenance of the designated OHV corridors within SPP.

5.3.9 Fishing, Boating and Canoeing

Objectives:

1. To provide for recreational fishing within the constraints of fish conservation and legislative obligations.
2. To provide opportunities for recreational boating within the constraints of the Canada Shipping Act Boating Restriction Regulations (Consolidated Regulations of Canada, 1978) and Alberta Boating Restrictions (Alberta Forestry, Lands and Wildlife, 1988).
3. To provide opportunities for recreational canoeing, kayaking, and row boating in SPP.

Actions:

- In order to retain viable fish populations, fishing opportunities will be provided consistent with the Alberta Sportfishing Regulations[6], maintained by Alberta Sustainable Resource Development.
- Boating on Emerson Lakes is under a Schedule III restriction (Canada Shipping Act Boating Restriction Regulations), i.e., power-driven vessels are prohibited except with authority of the federal transport minister. Alberta Community Development also recommends a Schedule III restriction for Beaver Lake and Sundance Lake.

5.3.10 Trapping

There are seven Registered Fur Management Areas (RFMAs) that lie either within or immediately adjacent to the SPP boundary.

Objectives:

1. To honour existing trapping commitments in SPP.

Actions:

- Trapping licenses sold prior to April 28, 1999 (Sundance Provincial Park establishment) will be honoured.
- Trapping guidelines in relation to public education will be developed (e.g., including issues of trapping lifestyle and activities, public safety and conflict minimization).
- Existing trapper's cabins can be maintained, but any additions or improvements require approval from Alberta Community Development. No new cabins will be built in SPP.

5.3.11 Public Safety

Objectives:

1. To ensure public safety for SPP visitors.
2. To minimize public safety hazards (e.g., to prevent bear/human encounters) through facility design and placement, and information dissemination.

[6] Subject to yearly revisions.

Actions:

- Provide information to ensure visitor safety while enjoying SPP.
- Erect an interpretive sign/kiosk at the viewpoint at kilometre 7.0 along the Swanson Road. The sign will provide information about the Park. The sign will also include a safety message warning that: travel north along the Swanson Road to the Wild Sculpture Trail Day Use Area is not recommended, particularly during wet weather, and travelers will require a 4x4 to maneuver parts of the road.
- Assess public safety issues and develop plans to mitigate emergency situations.
- Take preventative, proactive measures to ensure visitor safety within SPP.
- Establish an Emergency Response Plan that provides guidelines for public safety and emergency response (e.g., work with local RCMP, search and rescue services), fire protection and evacuation.

5.4 HERITAGE TOURISM

The following **Heritage Tourism Goal** provides direction for Provincial Parks:

"Provincial Parks provide opportunities for provincial, national and international visitors to explore and experience Alberta's natural heritage."

5.4.1 General Tourism Management

Objectives:

1. To work with local governments (Towns of Hinton and Edson, Yellowhead County), private sector, facility operators (Fox Creek Developments Ltd.), industry (Hinton Wood Products, Weyerhaeuser Company Ltd.), recreational groups (Edson and Hinton ATV Clubs, Edson Snowmobile Club, Yellowhead District 4H Club), and volunteer organizations to determine the nature-based tourism potential of SPP.

2. To emphasize tourism opportunities that enable appreciation of SPP's natural and cultural features.
3. To manage commercial guiding and tourism within SPP by establishing quotas and ensuring that operators and guides abide by provincial policies, legislation, certifications and guidelines.

Actions:

- The following principles will be applied when assessing ecotourism opportunities in SPP.
  - Recognize that preservation, awareness and enjoyment of natural and cultural elements are the key elements of the visitor experience.
  - Promote positive environmental ethics.
  - Provide benefits to participants through education and interpretation.

5.4.2 Commercial Tourism Activities

Feedback from the Edson Open House, (October 22, 2002) indicated that the local public does not support commercial tourism activities within the Park.

Objectives:

1. To manage commercial tourism activities within SPP according to the mandate of the Provincial Park.

Actions:

- Commercial facilities are not being considered at this time but will be reviewed if future proposals come forward, or increased visitor use warrants these facilities. Alberta Community Development will determine if the commercial facility proposal fits the intent of SPP.
- Within existing parks and protected areas legislation and regulations, operating conditions will be applied for the following commercial activities: commercial guiding, outfitting, trail riding (non-motorized), backcountry activities and tours.
- Helicopter aircraft landings will only be permitted for emergency or government business where necessary. The *Provincial Parks Act* prohibits unauthorized aircraft landings in the Provincial Park.

5.5 REGIONAL COOPERATION

Objectives:

1. To maintain cooperative relationships with land and resource managers (Alberta Sustainable Resource Development), and resource users (Hinton Wood Products and Weyerhaeuser Company Ltd.), facility operators (Fox Creek Developments), other industry and recreational users.
2. To work cooperatively with local governments (e.g., Yellowhead County, Towns of Edson and Hinton).

Actions:

- Develop cooperative monitoring and assessment programs for natural resource management.

6.0 IMPLEMENTATION OF PLAN

6.1 PROJECTS IDENTIFIED IN PLAN

Table 3. includes a list of the priority projects and actions identified in the plan for completion. Each project/action is listed with a proposed start date for initiation. Priority project/action completion will depend on manpower and the availability of funding.

Table 3: Priority Projects and Actions

Priority Projects and Actions	Timelines
Commence trail, campsite monitoring, assessment and reclamation planning.	April 2007, Ongoing
Develop trail and campsite brochures, fact sheets, maps, signs and other interpretive materials.	April 2007, Ongoing
Continue implementation of the Special Management Zone for resource management.	Ongoing
Maintain and enhance existing stewardship and stakeholder relationships.	Ongoing
Enforcement and compliance of non-motorized use on existing trails and bridges will continue to be an area of enforcement focus.	Ongoing
Develop co-operative monitoring and assessment programs for natural resource management.	Ongoing
Establish an emergency response plan safety review.	May 2007, Ongoing
Maintain facility operating agreement with Hinton Wood Products.	Ongoing
Erect natural barriers to prevent illegal access into the Park by OHVs.	Ongoing. Some completed.
Implement an information kiosk at the Swanson Road Viewpoint, West Park Foot Access, Athabasca River Access Day Use Area, Wild Sculpture Trail Day Use Area, along Wild Sculpture Trail System and at access points along the Swanson Road (junction with the main pipeline and with the Snowmobile Staging Area).	Dependent on budget and capital priority. Kiosk (with map) installed at Swanson Road Viewpoint and Wild Sculpture Trail Day use area.
Sign all Park boundaries and trails within the Park.	Dependent on budget and capital priority. Some trail and boundary signs installed.
Liaise with trappers to reclaim old access routes.	Ongoing
Upgrade Rupert's Bridge crossing and the main pipeline/ power line and maintain them as designated motorized corridors for OHV use across the Park.	Dependent on budget and capital priority.
Develop an Equestrian Staging area south of the Emerson Creek Road.	Dependent on budget and capital priority.
Install hitching rails northeast of the Hoodoos Preservation Zone.	Dependent on budget and capital priority.
Develop and maintain the Upper Ridge Equestrian trail.	Dependent on budget and capital priority.
Develop and maintain a permanent overnight horse campsite south of Sundance Lake.	Dependent on budget and capital priority.
Formalize and maintain the Emerson Creek Day Use Area.	Ongoing. Almost completed.
Formalize and maintain the Athabasca River Access, Boat Launch and Day Use Area.	Ongoing. Partially complete and pending budget and capital priority.

Additional action items will be included and prioritized as they are approved. These will be dependent on budget allocation and factors such as volunteer and facility operating agreement support.

GLOSSARY OF TERMS

Aeolian	Relating to, or caused by, the wind. Aeolian deposits are materials which have been transported and laid down on the earth's surface by the wind, and include *Loess*, and the sand of deserts and dunes (Moore, 1949).
Assiniboine	Indian name meaning "those who cook by placing hot stone in water"
Bog	A nutrient-poor, organic wetland not influenced by mineral groundwater, developing an acidic peat forming a level, raised or sloping surface with raised hummocks and wet hollows, usually covered by a moss carpet dominated by *Sphagnum* spp. And supporting a layer of ericaceous shrubs, with or without trees (Achuff, 1994).
Boulder Springs	Occur in areas where topographic gradients decrease, such as the bottoms and sides of major valleys; the boulder-strewn discharge paths area characterized by a continuous pavement of large, rounded, lichen-covered boulders and bleached wood fragments (Vogwill, 1983).
Boulder-Tufa Springs	Springs with a drainage path generally composed of large rounded boulders encrusted with cream to buff tufa deposits; most abundant in the central foothills; usually occurring at abrupt steepenings of slope often associated with the edge of a Tertiary plateau (Vogwill, 1983).
C.C.E.	Calcium Carbonate Equivalence – the quality cutoff used to define marl (Macdonald, D.E., 1982).
Coal Branch	An area along the eastern slopes, which was populated as a result of the need for coal for the railways. The following settlements existed in the coal branch at one time or another: Luscar, Bickerdike, Erith, Weald, Embaras, Robb, Coalspur, Diss, Sterco, Foothills, Lovett, Coal Valley, Shaw, Mercoal, Leyland, Cadomin and Mountain Park. Cadomin is the only hamlet remaining today (Ross, 1974).
Drumlin	Oval or elongated hill believed to have been formed by the streamlined movement of glacial ice sheets across rock debris, or till (Encyclopedia Britannica Inc.©, 2002).
Ecosystem Management	The integrated management of natural heritage and human activities to maintain or enhance the integrity of ecosystems and processes.
Environmentally Significant Areas (ESAs)	Important, unique and often sensitive features of the landscape.
Eskers	Ridge caused by glacial stream: a long narrow winding ridge of sand or gravel, deposited by a stream flowing under a glacier (Encarta® World English Dictionary, 2001).
Fen	A nutrient-rich, organic wetland influenced by mineral-bearing groundwater, developing a poorly to moderately decomposed peat but often well decomposed near the base, with a circumneutral to slightly alkaline pH. The surface is generally level and uniform, occasionally with subparallel ridges or slightly elevated islands, linear drainage features and dispersed small pools, usually covered predominantly with brown mosses, sedges, grasses and often scattered willow and birch shrubs or trees (Achuff, 1994).
Geology	Scientific study of the Earth, including its composition, structure, physical properties, and history. The term geology is broadly inclusive and is often regarded as embracing all of the geologic sciences. Geology is commonly divided into a number of subdisciplines: (1) those concerned with the

	chemical makeup of the solid Earth, which include the study of minerals (mineralogy) and rocks (petrology); (2) those having to do with the structure of the solid Earth, as, for example, the study of the relationships of rocks and geologic features in general (structural geology) and the science of volcanic phenomena (volcanology); (3) those concerned with landforms and the processes that produce them (geomorphology and glacial geology); (4) those dealing with geologic history, including the study of fossils and the fossil record (paleontology), the development of sedimentary strata (stratigraphy), and the evolution of planetary bodies and their satellites (astrogeology); and (5) economic geology and its various branches— *e.g.*, mining geology and petroleum geology. Some major fields closely allied to geology are geodesy, geophysics, and geochemistry (Encyclopedia Britannica Inc.©, 2002).
Gley	Gleying is a reduction process that takes place in soils that are saturated with water for long periods of time. The horizon of most intense reduction is characterized by a gray, commonly mottled appearance, which on drying shows numerous rusty brown iron stains or streaks. Those horizons in which gleying is intense are designated with the subscript g (Dumanski et. al., 1972).
Geomorphology	The study of the forms of the land's surface and of the processes that mold them. As the branch has developed, landforms increasingly have been described with quantitative measures. The processes of weathering, erosion, transport, and deposition are analyzed. Fluvial, glacial and periglacial, coastal, and aeolian processes are recognized and are often the subjects of specialized study (Encyclopedia Britannica© Inc. 2002).
Glaciofluvial Deposits	Deposits that are formed by glacial meltwater streams (Encyclopedia Britannica© Inc. 2002).
Hardwood	Wood like oak: wood from a broad-leaved tree, for example, oak, ash, or birch, as opposed to from a conifer (Encarta® World English Dictionary, 2001).
Hoodoos	A column, pinnacle, or pillar of rock or cemented conglomerates produced in a region of sporadic heavy rainfall by differential weathering or erosion of horizontal strata (e.g., undercutting by wind), facilitated by joints and by layers of varying hardness, and occurring in varied and often eccentric or grotesque forms (A.G.I. 1984; Whittow 1984).
Kames	Ridge formed by a glacier: a ridge of sand and gravel left by a melting glacier (Encarta® World English Dictionary, 2001).
Land Status Automated System (LSAS)	Alberta Surface Public Land and Crown Mineral dispositions and activities are contained within the Land Status Automated System (LSAS). This data is essential to the management of agreements that cover publicly owned resources. The primary applications of this system are: (a) Provide access to accurate and timely information relating to public land, and surface and mineral interests on Crown land (e.g., surface activities, mineral dispositions); and (b) Support data capture requirements of government departments through inputting and maintaining their data (e.g., all activities and land for the departments of Energy, Sustainable Resource Development and Environment) (Government of Alberta, 2001).
Marl	Freshwater, fine grained, friable, light-colored limestone that contains greater than 50 percent C.C.E (Macdonald, D.E., 1982). Pettijohn (1957) defined marl as a "semifriable mixture of clay material and lime carbonate". Depending on the use of the marl deposit it will require a certain percentage of calcium carbonate known as C.C.E. or Calcium Carbonate Equivalent.

Off Highway Vehicle (OHV)	An Off Highway Vehicle, as defined for the purposes of this management plan, refers to land or snow vehicles with a curb weight of 590kg (1300lb) or less, tire pressure of 110Kpa (16psi) or less, wheel base of 1.85m (73") or less, and width of 1.78m (70") or less.
Protective Notation (PNT)	A Protective Notation (PNT) is a type of Reservation/Notation entry in the Alberta Government Land Status Automated System. This entry imposes a land use restriction, that may be indefinite or subject to change over time, and is usually due to specific natural features of the land (e.g., land-form, soil type or vegetative characteristics).
Softwood	Wood of coniferous tree: the open-grained wood of a pine, cedar, or other coniferous tree. Many softwoods are, in fact, hard and durable (Encarta® World English Dictionary, 2001).
Soaphole-Ungulate Licks	Occur in areas of flat topography underlain by silts and clays of glacial origin; form a mounded area of quick ground supported by upward moving groundwater and are usually surrounded by reeds and tussock grass (Vogwill, 1983).
Sulphur Springs	Denotes places at which groundwater is discharged with a relatively high sulfate (15 to 30% epm of anions) content (Vogwill, 1983).
Till	Any material laid down directly or reworked by a glacier (Encyclopedia Britannica© Inc. 2002).
Tufa	Porous rock formed as a deposit from springs or streams usually containing greater than 80 percent C.C.E., consisting of micrite and coarser calcite (Macdonald, 1982).
Zoning	A system by which areas within a park or protected area are recognized according to their specific management requirements for preservation, as well as their capability to accommodate heritage appreciation, outdoor recreation and heritage tourism.

LITERATURE CITED

Achuff, P.L. 1994. *Natural Regions, Subregions and Natural History Themes of Alberta. A Classification for Protected Areas Management. Protected Areas Report No. 2.* Prepared for Wildland Parks Service, Alberta Environmental Protection. Edmonton, Alberta. 72pp.

Ahlf, Marguerite. 1986. *Edson – 75 Years. A History of the Town.* Jostens Publications. Winnipeg, Manitoba. 224 pp.

Alberta Environment. 1985. Policy for the Management of Research and Collection Activities. July 15, 1985. Ref. 9.3. *Wildland Parks' Policies and Directives Manual.* Alberta Environment.

Alberta Environment. 1987. Special Events in Provincial Wildland Parks and Recreation Areas. March 31, 1987. Ref. 6.11. *Wildland Parks' Policies and Directives Manual.* Alberta Environment.

Alberta Environment. 1988. Commercial Guiding or Instructing of Outdoor Activities in Provincial Parks and Provincial Recreation Areas Policy. July 29, 1988. Ref. 6.12. *Wildland Parks' Policies and Directives Manual.* Alberta Environment.

Alberta Environment, "Status of Alberta Wildlife, September 1999" http://www.gov.ab.ca/env/fw/status/index.html [Accessed April 18, 2001].

Alberta Environmental Protection (AEP). 1997. *A Fish Conservation Strategy for Alberta 1997-2005.* Alberta Environment, Fisheries Management Division. Edmonton, Alberta.

Alberta Forestry, Lands and Wildlife. 1988. *Boating in Alberta. A Summary of Boating Restriction Regulations.* Edmonton, Alberta. 55 pp.

American Geological Institute. 1984. *Dictionary of Geological Terms.* 3rd Edition. R. Bates and J. Jackson eds.

Bentz, J., Brierly, D., Hay, W., Nelson, S., Robertson, S. and R. Wehrhahn. 1986. *Integrated Resource Inventory of the Coal Branch Study Area: Ecological Land Classification-Volume 1.* Natural Resources Information Services, Resource Evaluation and Planning Division. Edmonton, Alberta. 291 pp.

CEAC. 1991. Canadian Environmental Advisory Council. 1991. *A Protected Areas Vision for Canada.* Ottawa: Minister of Supplies and Services, Government of Canada.

Consolidated Regulations of Canada. 1978. *Canada Shipping Act. Boating Restriction Regulations.* CRC, Vol. XV, c. 1407. http://www.tc.gc.ca/actsregulations/GENERAL/C/csa/regulations/001/csa005/csa5-a.html [Accessed December 5, 2002].

Damkjar, Eric. 2001. Eastern Slopes Archaeologist, Archaeology and History, Community Development. Edmonton, Alberta. August 1, 2001.

Dumanski, J., Macyk, T.M., Veauvy, C.F., and J.D. Lindsay. 1972. *Soil Survey and Land Evaluation of the Hinton-Edson Area, Alberta.* Alberta Institute of Pedology. Report No. S-72-31. 119 pp.

Encarta®, World English Dictionary [North American Edition] © & (P) 2001 Microsoft Corporation, http://dictionary.msn.com/find/entry.asp?search [Accessed June 8, 2001].

Encyclopedia Britannica© Inc. 2002. "drumlin" *Encyclopedia Britannica* http://www.britannica.com/eb/article?eu=1627 [Accessed June 19, 2002].
"geology" *Encyclopedia Britannica* <http://www.britannica.com/eb/article?eu=37170> [Accessed September 17, 2002].
"geomorphology" *Encyclopedia Britannica* <http://www.britannica.com/eb/article?eu=37180> [Accessed June 19, 2002].
"glacial landform" *Encyclopedia Britannica* <http://www.britannica.com/eb/article?eu=120701> [Accessed June 19, 2002].
"till" *Encyclopedia Britannica* <http://www.britannica.com/eb/article?eu=74377> [Accessed June 19, 2002].

Ficht, J. 2002. Wildlife Biologist, Alberta Sustainable Resource Development. Edson, Alberta. December 30, 2002.

Gabert, G.M. and Roed, M.A. 1968. *Bedrock Topography and Surficial Aquifers, Edson Area, Alberta.* Research Council of Alberta Report 68-1. 9 pp.

Geographics Dynamic Corp. 2001. *Sundance Provincial Park Vegetation Survey*. Prepared for Alberta Community Development, Parks and Protected Areas, Edson, Alberta. January 2002. 29 pp.

Government of Alberta. 2001. Alberta Energy. http://ets.energy.gov.ab.ca/lsas/index.htm [Accessed September 17, 2002].

Hendee, J.C., Stankey, G.H. and Lucas, R.C. 1990. *Wilderness Management* 2nd Edition. North American Press. Golden, Colorado.

Hildebrandt, D. 2002. Fisheries Technician, Sustainable Resource Development, Alberta Environment. Edson, Alberta. December 3, 2002.

Hinton Forest Resources. 2002. *Three Year Recreation Action Plan 2002-2004.* Weldwood of Canada Limited. Prepared by Aaron Jones. January 2002.

Johnson, C.F. and Walker, J. 1997. *Survey of Sportfish in Upper Sundance Creek August 1996.* Fisheries Management Enhancement Program and Foothills Model Forest.

Macdonald, D.E. 1982. *Marl Resources of Alberta.* Earth Sciences Report 82-1. Alberta Geological Survey and the Alberta Research Council.

Moore, W.G. 1949. *A Dictionary of Geography*. 5th Edition. Penguin Books. 246 pp.

Mussieux, R. and Nelson, M. 1998. *A Traveller's Guide to the Geological Wonders of Alberta.* The Provincial Museum of Alberta and Canadian Society of Petroleum Geologists. 254 pp.

Nelson, S., B. Hay and G. Michalchuk. 1988. *Ecological Land Classification of the Yellowhead North.* Prepared for Resource Inventory Section, Land Information Branch, Alberta Forestry, Lands and Wildlife.

Noss, Reed. 1995. *Maintaining Ecological Integrity in Representative Reserve Networks.* Discussion Paper. World Wildlife Foundation Canada. Toronto, Ontario.

Provincial Parks Act. 1985. General Alberta Regulations (102/85). *Amendment Regulation A.R. 71/98.*

Roed, M.A. 1968. *Surficial Geology of the Edson-Hinton Area, Alberta.* Unpublished Ph.D. Thesis, University of Alberta, Edmonton.

Ross, Toni. 1974. *Oh! The Coal Branch, a Chronicle of the Alberta Coal Branch.* D.W. Friesen and Sons Ltd. Calgary, Alberta. 340 pp.

Sweetgrass Consultants. 1994. *Preliminary Inventory of Environmentally Significant Areas within the Foothills Model Forest.* Foothills Model Forest, Hinton, Alberta. Canadian Forest Service, Edmonton, Alberta.

Vogwill, R.I.J. 1983. *Hydrogeology of the Edson Area, Alberta.* Earth Sciences Report 79-7. Alberta Research Council.

Wright, J. 2002. Sundance Provincial Park Management Planning Process Stakeholder. Hinton, Alberta. October 24, 2002.

Whittow, J.B. 1984. *The Penguin Dictionary of Physical Geography.* Penguin Books. 591 pp.

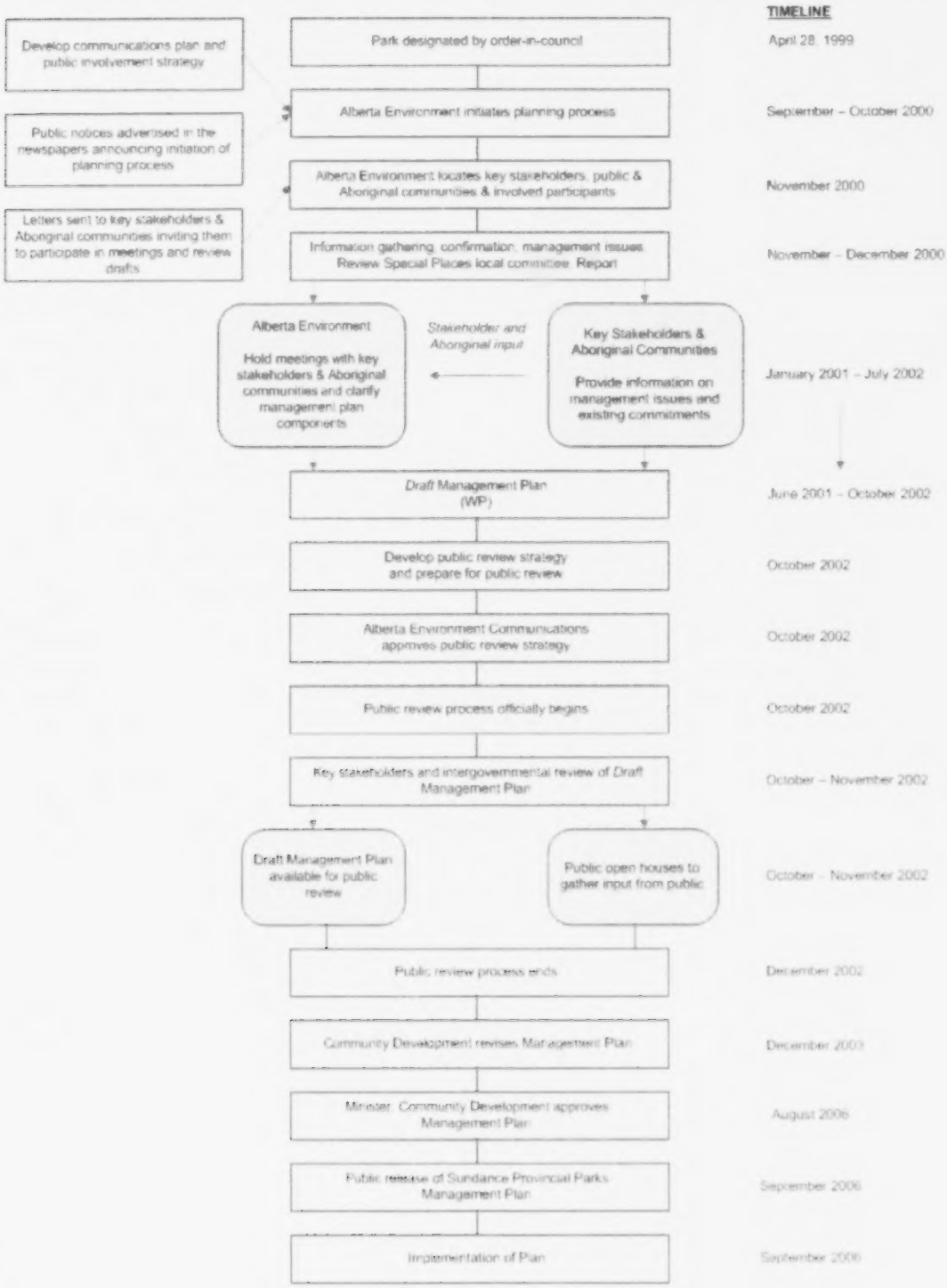
Yellowhead Regional Planning Commission. 1986. *Yellowhead Region Native Heritage.* 8 pp.

Yellowhead Regional Planning Commission. 1987. *The Yellowhead Region, An Economic Overview.* 148 pp.

Weldwood of Canada © 2002. Hinton Forest Resources http://www.weldwood.com/hinfr01/internet/hinnet.nsf [Accessed September 9, 2002].

APPENDIX I

SUNDANCE PROVINCIAL PARK MANAGEMENT PLANNING PROCESS


TIMELINE
Develop communications plan and public involvement strategy
Park designated by order-in-council
April 28, 1999
Public notices advertised in the newspapers announcing initiation of planning process
Alberta Environment initiates planning process
September – October 2000
Letters sent to key stakeholders & Aboriginal communities inviting them to participate in meetings and review drafts
Alberta Environment locates key stakeholders, public & Aboriginal communities & involved participants
November 2000
Information gathering, confirmation, management issues Review Special Places local committee Report
November – December 2000
Alberta Environment
Hold meetings with key stakeholders & Aboriginal communities and clarify management plan components
Stakeholder and Aboriginal input
Key Stakeholders & Aboriginal Communities
Provide information on management issues and existing commitments
January 2001 – July 2002
Draft Management Plan (WP)
June 2001 – October 2002
Develop public review strategy and prepare for public review
October 2002
Alberta Environment Communications approves public review strategy
October 2002
Public review process officially begins
October 2002
Key stakeholders and intergovernmental review of Draft Management Plan
October – November 2002
Draft Management Plan available for public review
Public open houses to gather input from public
October – November 2002
Public review process ends
December 2002
Community Development revises Management Plan
December 2003
Minister, Community Development approves Management Plan
August 2006
Public release of Sundance Provincial Parks Management Plan
September 2006
Implementation of Plan
September 2006

APPENDIX II

The Sundance Provincial Park Special Management Zone

Overview:
A 500-metre Special Management Zone surrounds the Sundance and Marl Bog protected areas. The purpose of this zone is to protect the ecological integrity of the special place without unduly restricting industrial activity. This will be accomplished through a Protective Notation (PNT).

Guiding Principles:
The principles of adaptive management will be used to refine or change these guidelines to reflect new knowledge and techniques that can ensure site protection.

Interdepartmental Committee:
The government Interdepartmental Committee has reviewed the proposed Sundance recommendation and supports implementation of the Special Management Zone and the provincial park (Sundance Provincial Park has subsequently been established by Order-in-Council).

In addition to the restrictions and exceptions noted on the attached PNT application, the following guidelines will be applied to activities occurring on lands lying within 500 metres of the boundary of Sundance Provincial Park. **These "guidelines" will be placed on LSAS under the "Admin. Remarks Field":**

Special Management Zone Guidelines:
(These are to be placed in the Admin. Remarks Field)

Access

1. No new permanent access.
2. All block roads are to be rolled back immediately following logging or site preparations.
3. No new gravel pits.

Timber Harvesting

1. Harvesting should be planned to maintain the range of forest vegetation, age classes, and stand structures appropriate for the area.
   i. Natural disturbance patterns should be mimicked as closely as possible.
   ii. Maintain the deciduous and coniferous forest types, appropriate to their historic presence.
   iii. Uneven-aged or mixedwood stands should be harvested in a manner to perpetuate this condition (e.g., shelterwood harvesting, small patch retention, green tree and snag retention, understory protection, etc.).
   iv. Even-aged stands will be harvested to regenerate stands of the same condition (e.g., clearcutting).
2. Detailed block plans and ecological assessments should be done, for each block, prior to harvest.
3. Visual Sensitivity analysis should be done, for each block, prior to harvest.
4. Minimize soil disturbance and retain a protective cover of vegetation and/or duff layer.
5. Stumpside processing is preferred except where it might impede reforestation.
6. Harvesting design should consider fuel management to reduce the risk of a catastrophic fire on the provincial park.

Silviculture

1. High importance should be placed on protecting advance growth.
2. Natural reforestation methods should be used where they will reliably reforest the area (dragging pine for naturals, suckering of aspen).
3. Where planting is prescribed, use seed sources adapted to the site (an approved forestry mix).

Petroleum and Natural Gas

1. New seismic activity is to make use of existing access wherever possible.
2. Remote seismic and handcut lines are required, no 3-D or other intensive exploration programs are permitted.
3. New cut seismic lines are restricted to handcut line-of-site, maximum 50 cm wide, with no trees over 8 cm diameter to be cut. New cut seismic lines are to be kept to a minimum.
4. In addition to the foregoing, the following standard conditions, affecting seismic activity adjacent to a provincial park, will still apply:
    a. When running into or paralleling an established protected area, hand cutting is permitted to within 100 meters of the protected area's boundary. Hand stringing of geophones will be permitted up to the boundary with the understanding that no surface disturbance will result and no vegetation clearing will be done.
5. New wellsites are to be drilled from locations outside the PNT, or from existing wellsites within the PNT. **Only if the resource is proven will additional wells, located within the PNT, be considered**.
6. Location and design of new wellsites located within the PNT will ensure that the following conditions are met:
    a. wellsites are to be located in areas that minimize the amount of cut and fill required,
    b. wellsites are to be located along existing access or previously disturbed areas,
    c. the total area of a wellsite is to be minimized as follows:
        i. Single rig max. 6400 m^2 (80m x 80m)
        ii. Double rig max.10,000 m^2 (100m x 100m)
        iii. Triple rig max. 14,400 m^2 (120m x 120m)
        iv. Wellsite edges should be shaped/contoured wherever possible to further reduce the total area of the site.
    d. new wellsites will not be located within 200 metres of the park boundary,
    e. closed drilling systems are required
        i. remote sump
        ii. use of drilling waste tanks,
    f. portable flare tanks are to be used unless it is demonstrated that unavoidable site operational factors dictate otherwise.
7. Reclamation work is to be completed within one year of lease abandonment and will include the use of an approved forestry mix.